# The Iron Age

## A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

*Vol. XXXII: No. 9.* *New York, Thursday, August 30, 1883.* *$4.50 a Year, Including Postage. Single Copies, Ten Cents.*


### Chinese War Preparations.

The possibility of hostilites between France and China, on account of the French attack upon Tonquin, has given rise to considerable activity at different points in the Celestial Empire, notably at the Kiangnan Arsenal, situated some three miles distant from Shanghai. It is probably the largest of the four arsenals now in the Empire, and, among other things, comprises a small shipbuilding yard with every requisite for the construction of ships of the size of the gun boats built in England for the Chinese Government. During the past two years the heavy ordnance department at Kiangnan has received no small amount of attention, and the work being turned out there is creditable, to say the least. As remarked in a former account of China's four arsenals, all the raw material for the guns manufactured is brought from England in the shape of bars of iron and steel, and these are welded into solid coils, bored and turned preparatory to their being contracted on the steel barrels. The engraving which we present this week, taken from the *Illustrated London News*, shows a number of Chinese workmen engaged in this operation of welding a coil, and gives a good idea of the manufacturing facilities for this kind of work at the command of the Chinese Government. The natives, as is generally acknowledged, are reliable workmen, and, were it not for the fact that they betray an almost invincible repugnance to innovations, improvements, or, in fact, anything new, they would give every satisfaction.

The prevailing opinion among the heads of the different departments, which, we would incidentally remark, are in almost all cases Europeans, is that Chinese labor, skilled and unskilled, will bear very favorable comparison with that of other mechanics. The only difference there is between the two is that the Celestials will not work under high pressure, but will take their own time over everything, no matter what its urgency; and they have their own secret societies, which, after the pattern of English and American trades unions, see that their members do not do too much work or take too little pay. The scale of remuneration ranges from $2 to $3 a week to the coolies, to $70, $80 and $90 a month to the foreman, the mean being $6 to $7 per week. And when it is remembered that they live mainly on rice and similarly inexpensive dishes, and, huddling together in wretched habitations, pay next to nothing for rent, and do not wear fine clothes, it will be seen that they have abundant opportunities for saving money. Their hours of labor average nine a day, and they leave off two hours earlier on Saturdays, and have Sunday entirely to themselves. As workpeople their steadiness can be relied upon, for they do not drink, and it is only a comparative few that indulge in opium smoking.

The shot and shell factory, the small-arms factory and the gun factory of the Kiangnan Arsenal are built according to European methods, this being to a certain extent shown by our engraving, and the work produced is considered equal to anything done in other countries.

---

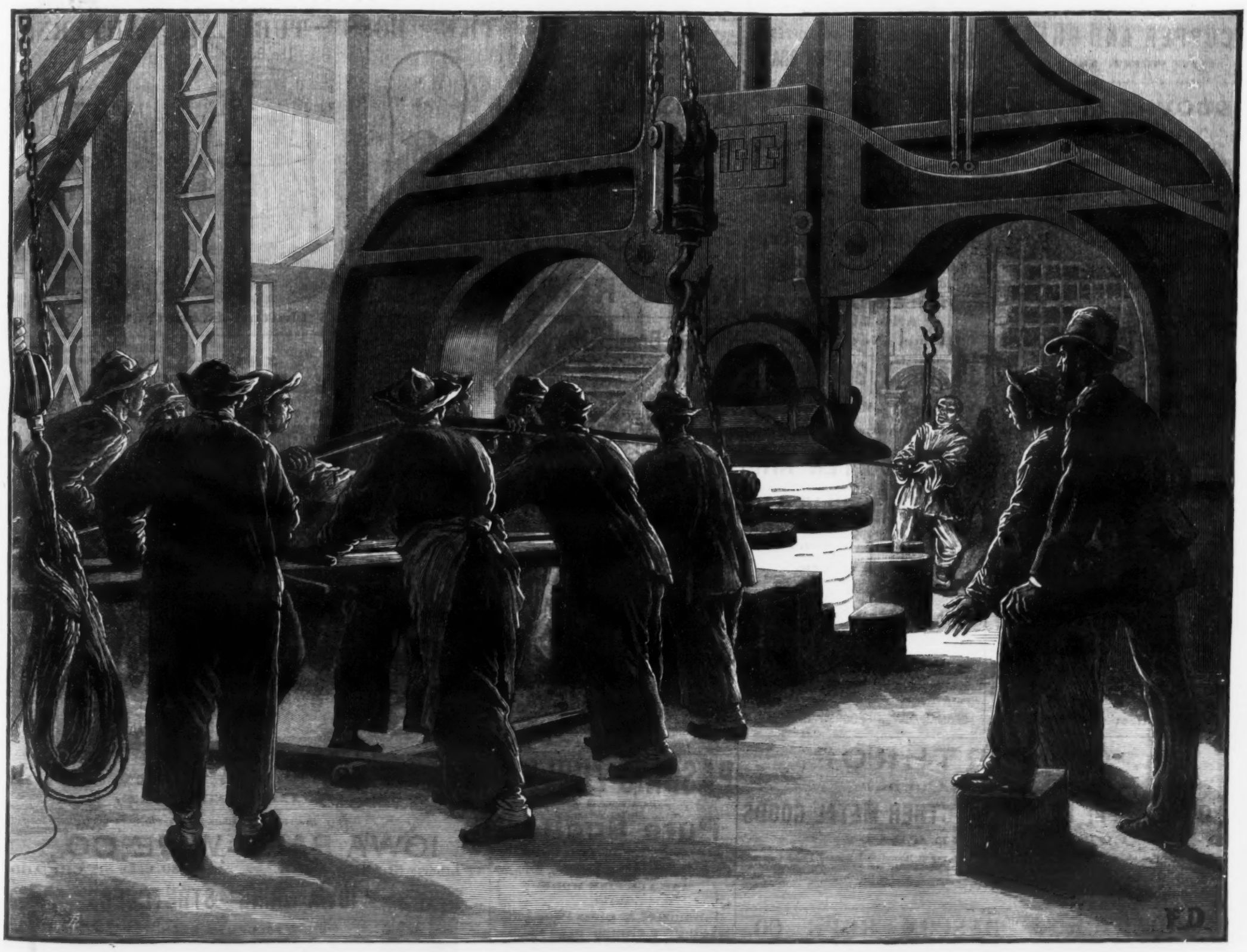
The contracts for the construction of the new Government cruisers were recently forwarded to and signed by Secretary Chandler. They are now in the hands of Mr. Roach. The dispatch boat Dolphin is under way, and work on the Boston, Atlanta and Chicago will be commenced in a short time. In fact, everything points to efforts being made by the Advisory Board to push forward the construction of the vessels as rapidly as possible. Inspectors have been ordered to take charge of the different branches of the work.

### Sampling of Iron Ores.

Our London contemporary, *Iron*, recently received a communication from Mr. Alexander J. Atkinson, of Cardiff, containing an interesting account relative to the different methods pursued in sampling iron ores. Among other things, Mr. Atkinson states that in the earlier phases of the import trade of Spanish ores into England it was customary to book contracts for large quantities, the delivery being effected in cargoes of from 400 to 600 tons, and it was found that the small samples, which are still commonly met with, gave fairly good results when averaged over a large number of deliveries. But in recent years the practice of selling individual cargoes has become more common, and the average tonnage of a cargo has been nearly quadrupled; yet, nevertheless, the system of sampling has, except in one or two cases, remained the same. While the methods of analyzing the samples for their several constituents have been brought to a state approaching to perfection, too little attention has, in Mr Atkinson's opinion, been paid to the mode of taking the samples. The method of procedure commonly adopted, and usually stipulated for in contracts in which the ore is guaranteed to contain a certain percentage of iron, is as follows: Representatives of the buyers and sellers meet at a certain point in the discharge of the cargo—usually when about half of the cargo has been taken from the vessel—and after an examination of the ore, they consult as to the proportion of large, medium-sized and small ore to be taken as representing the bulk. They then select six or eight wagons from which to take the sample, or sometimes descend into the holds and take the sample from the surfaces there exposed. The taking of the same consists in breaking from all available lumps small pieces, which are supposed to represent the lumps from which they have been broken. These pieces are collected in a measure and supplemented by proportionate measures of the medium-sized and small ore. In this way a sample is, or should be, taken from each hold. The total amount taken weighs 40 or 50 pounds. Thus is the essential part of the sampling performed. For the rest, it consists of mechanical operations of crushing, sifting, mixing, dividing, further crushing and mixing, packing into tins or bottles and sealing.

When a sample has been once so taken and sealed, it is considered final and binding upon buyers and sellers in regard to the whole cargo. It scarcely needs to be pointed out that this method may lead to very uncertain results. The two agents may be men of different caliber, in which case it is conceivable that the sharper or more zealous may unduly influence the result to the advantage of his principal; or a conscientious difference of opinion with regard to the proportions of the three grades of the ore, or of the reasonableness in accepting or rejecting certain wagons or representative or not of the cargo, may prevent them coming to terms, they preferring to do nothing rather than commit their principals to an unjust sample. When a disagreement of this kind takes place, its solution is not an easy matter, since by the time that further instructions have been received the vessel may have finished discharging, and the ore may have been removed to its destination exposed in open wagons to the vicissitudes of our climate. Even when the agents meet amicably and sample fairly, it is evident that at one visit they can do no more than take a sample representing the portion of the cargo exposed at that time; that which has already been removed, or that which lies beneath the surface, is omitted from this sample, which, for better or for worse, determines the price of the whole cargo.

Another method of taking samples, and one which is gaining more advocates as time advances, is that known as the tub-sample. This consists in allowing the laborers employed in discharging the cargo to fill one or two tubfuls of ore from each hold, and in having these 2 or 4 tons of ore crushed by a number of laborers upon a large plate, until, as in the previous method, after repeated crushing and mixing, a representative portion in a sufficiently fine state of division is obtained, this being then packed and sealed. The advantage claimed for this method is that the fairness of the sample is independent of the skill of the samplers, but it is questionable whether this advantage is not outweighed by the nature of the sample being to a great extent the result of chance. In common with the method first described, this method is open to the objection that unless the quality of the ore is uniform throughout—a condition that rarely exists—it does no more than give a sample representative of the portion of the cargo being worked while the sample is being taken. Moreover, it is uncertain that a tub filled in the hold will give a fair representation of the proportions of the large and small ore, since by the motion of the vessel a separation of the lumps from the small takes place, the lumps rolling to the wings, leaving the small in the center; hence, a tubful taken from the wing will consist almost entirely of lumps, while one filled from the center will hold an undue proportion of small ore. Wherefore, when this system is adopted, it is always advisable to take two tubfuls from each hold—one from the wing and one from the center. This, however, entails a loss of 3 or 4 tons of ore to the seller, the whole amount falling to the lot of the buyer in consideration for having provided the labor required in crushing



WELDING A COIL FOR A GUN AT THE KIANGNAN ARSENAL, NEAR SHANGHAI.

## ANSONIA
BRASS & COPPER CO.,
No. 19 Cliff Street,
Phelps Building, NEW YORK,
MANUFACTURERS OF
BRASS AND COPPER
IN
Sheets, Bolts, Rods, Wire, &c.
**Seamless Brass & Copper Tubing.**
Ansonia Corrugated Stove Platforms.
PURE COPPER WIRE
Electrical Purposes, Bare and Covered.
Phosphor Bronze Rods for Pumps, &c.
ANSONIA ★ REFINED
INGOT COPPER.

## PHELPS, DODGE & CO.,
IMPORTERS OF
TIN PLATE,
ROOFING PLATE,
Sheet Iron Copper, Pig Tin, Wire, Zinc, &c.
MANUFACTURERS OF
COPPER AND BRASS.
CLIFF STREET, NEW YORK.

## SCOVILL MFG CO
BRASS,
HINGES WIRE, GERMAN SILVER.
PHOTOGRAPHIC GOODS.
BUTTONS,
CLOTH AND METAL.
DEPOTS
419 & 421 Broome St., N. Y.
177 Devonshire St., Boston.
183 Lake St., Chicago.
FACTORIES,
Waterbury, Conn.
New Haven, Conn.
New York City.

## DICKERSON, VAN DUSEN & CO.,
*Importers of*
Tin Plate, Pig Tin, Sheet Iron, Copper, Wire, Zinc, Etc.
29 & 31 Cliff St., cor. Fulton,
DICKERSON & CO., Liverpool. NEW YORK.

## THE NEW HAVEN COPPER CO.,
SOLE MAKERS OF
POLISHED COPPER
Under Patent of T. James, Sept. 12, 1876.
ALSO MANUFACTURERS AND DEALERS IN
BRAZIERS & SHEATHING COPPER,
Kettles, Bottoms, Bolts, Circles, &c.
290 Pearl Street - NEW YORK.

## Waterbury Brass Co.
CAPITAL, $400,000.
Sheet, Roll and Platers' Brass,
GERMAN SILVER,
Copper, Brass and German Silver Wire,
BRASS AND COPPER TUBING,
COPPER RIVETS AND BURS,
*BRASS KETTLES,*
Door Rail, Brass Tags,
PERCUSSION CAPS,
POWDER FLASKS,
Metallic Eyelets, Shot Pouches, Tape Measures, &c.
And small Brass Wares of every Description.
Cartridge Metal in Sheets or Shells a Specialty.
Sole Agents for the
Capewell Mfg. Co.'s Line of Sporting Goods.
DEPOTS, 296 Broadway, New York, 125 Eddy St., Providence, R. I.
Mills At WATERBURY, Conn.

## Detroit Copper & Brass Rolling Mills.
BRAZIERS' AND SHEATHING COPPER,
ROLLED, SHEET & PLATERS' BRASS
GERMAN OR NICKEL SILVER,
Copper Wire for Electrical and other purposes, Brass and German Silver Wire,
*Copper Rivets and Burs,*
COPPER BOTTOMS FOR TEA KETTLES AND BOILERS.
Cor. Larned & Fourth Sts., Detroit, Mich.

## ROME IRON WORKS,
Manufacturers of
Brass, Gilding Metal, Copper and German Silver
(In Sheets, Rods, Tubing or Wire),
COPPER & BRASS RIVETS AND BURS.
Rome, New York.

## BROWN & BROTHERS,
81 Chambers St., N. Y. Waterbury, Conn.
MANUFACTURERS OF
BRASS, COPPER AND GERMAN SILVER
In Sheets, Rolls, Rods, Wire, Tubing,
Rivets, and Burs, Etc.
ALSO,
Seamless Brass & Copper Tubing.
PATENTED SEAMLESS BRASS AND COPPER HOUSE BOILERS, warranted to stand 200 lbs. pressure and guaranteed against vacuum.
PATENTED SPRING TEMPERED SHANK, SILVER-PLATED, FLAT TABLE WARE, in rich designs.
GERMAN SILVER SPOONS AND FORKS.

## The Plume & Atwood Mfg. Company,
MANUFACTURERS OF
SHEET and ROLL BRASS and WIRE,
German Silver and Gilding Metal,
Copper Rivets and Burs,
Copper Electrical Wire, Pins,
Brass Butt Hinges.
Jack Chain,
Kerosene Burners,
Lamp Trimmings, &c.
18 Murray Street, New York.
13 Federal Street, Boston.
109 Lake Street, Chicago.
Rolling Mill, THOMASTON, Ct. | Factories, WATERBURY, Ct.

## Bridgeport Brass Co.,
MANUFACTURERS OF
Sheet and Roll Brass,
Brass & Copper Wire & Tubing.
Seamless and Brazed Tubing.
Copper and Iron Rivets.
OILERS and CUSPADORES, | LAMPS and TRIMMINGS,
LANTERNS and TRIMMINGS, | KEROSENE BURNERS,
Clocks & Fly Fan Movements, | PLUMBERS' MATERIALS.
Particular attention paid to cutting out Blanks and manufacturing Metal Goods.
MANUFACTORY, *Bridgeport, Conn* | WAREHOUSE, *19 Murray St., N. Y.*

## HARRISON WIRE CO.,
ST. LOUIS, MO.,
MANUFACTURERS OF
WIRE
AND
WIRE ROPE.

## Holmes, Booth & Haydens,
WATERBURY, CONN.
NEW YORK, 49 Chambers St. | BOSTON, 18 Federal St.
Manufacturers of all kinds of
Brass, Copper & German Silver,
ROLLED AND IN SHEETS.
BRASS & COPPER WIRE,
Tubing, Copper Rivets & Burs.
BRASS & IRON
JACK CHAIN, DOOR RAIL.
German Silver Spoons,
SILVER PLATED FORKS & SPOONS,
Kerosene Burners, &c.

## JOHN DAVOL & SONS,
Agents for
Brooklyn Brass & Copper Co.,
Dealers in
Ingot Copper, Spelter, Lead, Tin, Antimony, Solder & Old Metals.
100 John Street, New York.

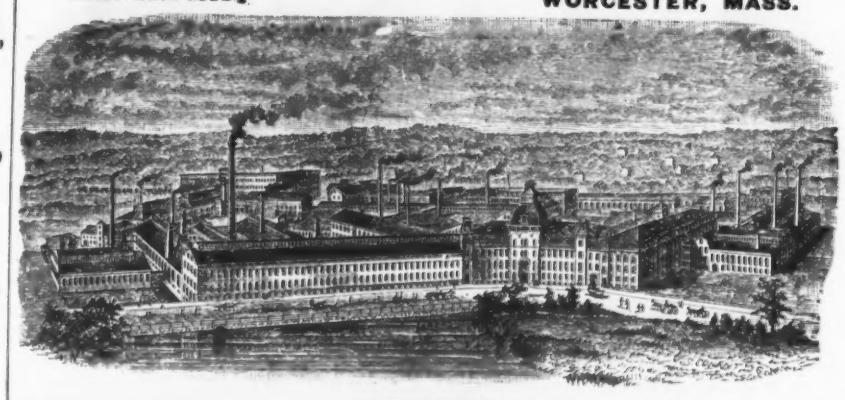
## PASSAIC ZINC CO.
Manufacturers of
Pure Spelter
FOR
Cartridge Brass, Gas Fixtures, Bronzes
AND ALL FINE WORK.
Also for
Galvanizers & Brass Founders.
MANNING & SQUIER, Gen'l Agents,
113 Liberty Street, N. Y.

## Geo. W. Prentiss & Co.,
HOLYOKE, MASS.,
MANUFACTURERS OF
IRON WIRE.

Bright, Coppered, Annealed and Tin Plated. Also GUN SCREW WIRE
Of all sizes straightened and cut to order.

BROWNING, SISUM & CO., 85 Chambers St
Manufacture
Belt Hooks, Cotters, Spring Keys, D Rings Staples, and everything pertaining to wire bending
Factory BROOKLYN.

PHILIP L. MOEN, President and Treasurer. CHAS. F. WASHBURN, Vice President & Secretary.
## WASHBURN & MOEN MANUFACTURING CO.
Established 1831. WORCESTER, MASS.



MANUFACTURERS OF
IRON and STEEL WIRE,
*Patent Steel Barb Fencing, Patent Steel Wire Bale Ties.*
WIRE RODS of all Grades; Round Iron, Rivet quality, 5-16 in. to ¼ in., cut to any length. Owners and exclusive Operators of the PATENT CONTINUOUS ROLLING MILL, producing Iron and Steel WIRE, in coils of 100 pounds, without SEAM or WELD. Patent Galvanized Telegraph Wire, Market and Stone Wire, Annealed Fence and Grape Wire in long lengths; Coppered Pall-Ball Wire; Rope, Bridge, Bolt, Screw, Rivet, Buckle and Chain Wire. Wire for the manufacture of Card Clothing, Heddles, Reeds, &c. Piano-string Covering Wire, Tinned Broom Wire and Tinned-plated Wire of all sizes. A specialty is made of Clock, Machinery, Gun Screw and Spiral Spring Wire, and Refined Wire to Pattern for particular purposes, from selected stamps of Norway Iron. Any grade of Wire furnished, Annealed, Bright, Polished, Coppered, Galvanized or Tin Plated. Wire furnished, Straightened and Cut to any length. Steel Crinoline Wire, Patent Linen finish. Unrivaled Steel Music Wire. Steel Wire for Springs, Needles and Drills. Market Steel Wire kept in stock, all sizes.
WAREHOUSES: New York, 16 Cliff, and 241 Pearl Sts. Chicago, 107 and 109 Lake St.

"NATIONAL WIRE AND LANTERN WORKS."
## HOWARD & MORSE,
MANUFACTURERS OF
THE "BOSS" TUBULAR LANTERNS.

Warehouse, 45 Fulton Street, New York.

ABRAM S. HEWITT, President. WM. HEWITT, Vice President. JAMES HALL, Treasurer. E. HANSON, Secretary.
## THE TRENTON IRON COMPANY,
(INCORPORATED 1847),
TRENTON, N. J., Manufacturers of
IRON and STEEL WIRE
OF ALL GRADES,
BRIGHT, ANNEALED, COPPERED, TINNED AND GALVANIZED
Iron and Steel Wire Rods;
EXTRA QUALITIES OF BAR IRON AND RODS.
Best Qualities of Gun-Screw and Charcoal Iron Wire; Crucible, Siemens-Martin and Bessemer Steel Wire.
Wire Straightened and Cut to Lengths.
New York Office, COOPER, HEWITT & CO., 17 Burling Slip.
Philadelphia Office, JOHN HEWITT, Agent, 21 North Fourth St.

WAREROOMS:
87 LIBERTY STREET, NEW YORK.
Works: WILKESBARRE, PA.

*This Advertisement Changed Weekly.*
## IOWA BARB WIRE CO.,
87 Liberty St., NEW YORK. 89 Lake St., CHICAGO.

IOWA RING STRETCHERS,
75 CENTS EACH.
Large discounts to the Trade.

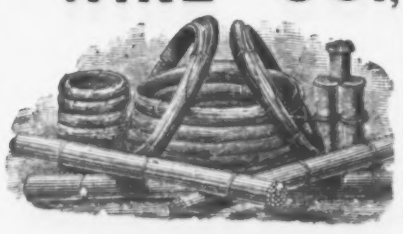
STAUFFER, MACREADY & CO., New Orleans, La. CARLIN & FULTON, Baltimore, Md.

## A. C. NORTHROP,
Waterbury, Conn.,
NOVELTIES IN BRASS AND OTHER METAL GOODS
FOR HARDWARE TRADE.
Wrought Iron and Brass Machine Screws; Turned, Hexagon, Round and Square Head Cap and Set Screws; Brass and Iron Safety and Jack Chain; Gilt, Nickel Plated and Bronze Trimmings of all kinds, from Sheet Iron, Steel or Brass.
Estimates on patented articles, or any description of Sheet Metal work respectfully solicited and romptly given.

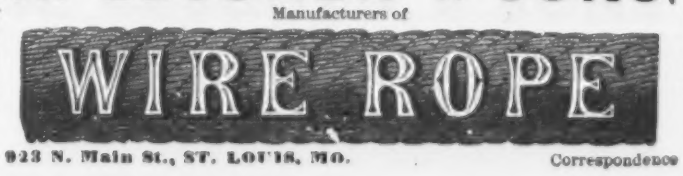
## BRODERICK & BASCOM ROPE CO.,
MANUFACTURERS OF

IRON WIRE ROPE. STEEL WIRE ROPE.
728 N. Main St., St. Louis, Mo

## WORCESTER WIRE CO.,
Manufacturers of
IRON AND STEEL
WIRE
For all Purposes.
WORCESTER, MASS.



## A. LESCHEN & SONS,
Manufacturers of




Tarred Lathyarn, Manila Rope. Hemp Packing. Twines.
919 to 923 N. Main St., ST. LOUIS, MO. Correspondence Invited

O. LINDEMANN & CO.,

Manufacturers of

Japanned, Brass, Tin Plate and Wood

BIRD CAGES

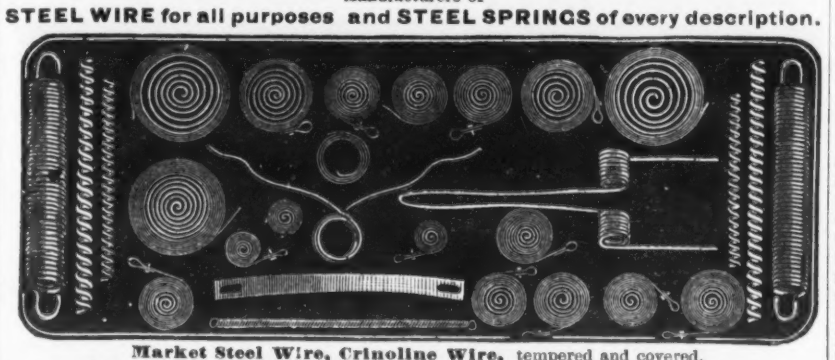
Original inventors and patentees of Bright Metal Cages, constructed without solder.

254 Pearl St., NEW YORK.

CARY & MOEN,

Manufacturers of

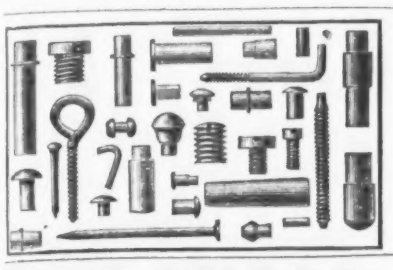
STEEL WIRE for all purposes and STEEL SPRINGS of every description.



Market Steel Wire, Crinoline Wire, tempered and covered.

Also Patent Tempered Steel Furniture Springs, constantly on hand.

234, 236 and 238 West 29th Street, - - - - - - NEW YORK.



IRON AND BRASS RIVETS,

Studs, Pins, Screws, &c.,

For Manufacturers of Light Hardware.

BLAKE & JOHNSON, Waterbury, Conn.

POPE, COLE & Co.

BALTIMORE COPPER WORKS,

No. 57 South Gay St., BALTIMORE, MD.,

Have always on hand and for sale

INGOT COPPER,

Also Cakes, of unequaled purity and toughness.

G. Gunther,

Manufacturer of

Patented Brass, Silver Plated and Japanned

BIRD CAGES.

Can be nested for export shipments.

46 Park Place, NEW YORK.

Largest variety in patterns and unsurpassed in low prices. New Illustrated Catalogues and Price Lists on application.

CLEVELAND WIRE WORKS

C. S. Tyler

MANUFACTURER OF

EXTRA HEAVY STEEL WIRE CLOTH

FOR STAMP BATTERIES.

Steel, Iron, Brass and Copper Cloth for COAL and ORE SCREENS, Flour Mills, Paper Mills, and Maltsters.

754 to 758 ST. CLAIR ST.

CLEVELAND, OHIO.

Bergen Port Spelter.

MINES: Lehigh Valley, Pa. WORKS & FURNACES, Bergen Port, N. J.

The only Miners and Manufacturers of

PURE

LEHIGH SPELTER

From Lehigh Ore.

Especially adapted for

Cartridge Metal and German Silver.

Also manufacturers of

BERGEN PORT OXIDE ZINC.

Superior for LIQUID PAINT on account of its body and wearing properties.

BERGEN PORT ZINC CO.

E. A. FISHER, Agent, 13 Burling Slip, N. Y.

G. M. HOTCHKISS & CO.,

West Haven, Conn.,

MANUFACTURERS OF

Brass, Iron & Steel Keys,

Locksmiths' and Bellhangers' Supplies,

HARDWARE SPECIALTIES.

Illustrated Catalogue Furnished on Application.

*Also Brass and Nickel Plated Suspender Buckles.*

NOVELTIES OF ALL KINDS, MADE EITHER OF SHEET METAL OR WIRE, A SPECIALTY.

NEW MAKE OF MINE LAMP.

LEONARD BROS., Scranton, Pa.

Over 30,000 tons of PERNOT OPEN HEARTH SPRING STEEL have been made and sold by this company within the past five years, most of which has supplanted Crucible Steel, to the entire satisfaction of the users, both in quality and price. Samples and prices on application to GAUTIER STEEL DEPARTMENT of CAMBRIA IRON CO., Johnstown, Pa.

[No. 42.]

NEW YORK OFFICE: 104 Reade St.

PHILADELPHIA OFFICE: 523 Arch St.

CHARLES A. OTIS, President. SAM'L ANDREWS, Vice President. SAM'L A. SAGUE, General Manager. THOS. JOPLING, Treasurer. JOHN C. ANDREWS, Secretary.

THE AMERICAN WIRE COMPANY,

DRAWERS OF

IRON AND STEEL WIRE OF EVERY DESCRIPTION

GALVANIZED, TINNED AND COPPERED WIRE.

High Grade and Fine Quality Wires a Specialty.

CLEVELAND, OHIO.

J. A. EMERICK. HOWARD EVANS.

MANUFACTURERS

MOLDERS' TOOLS,

FOUNDRY FACING,

MOLDING SAND,

FOUNDRY SUPPLIES,

J. A. EMERICK & CO.,

1056 to 1076 Beach St., PHILADELPHIA.

ESTABLISHED 1837. H. S. CHASE, Sec'y.

INCORPORATED 1876. C. F. POPE, Treas.

Waterbury Mfg. Co.,

WATERBURY, CONN.

Brass Goods.

PRIZE MEDALLISTS.

Exhibitions of 1862, 1865, 1867, 1872, 1873, and only Award and Medal for Noiseless Steel Shutters at Philadelphia 1876, Paris 1878, and Melbourne 1881.

CLARK, BUNNETT & CO., Limited,

Late CLARK & COMPANY,

Original Inventors and Sole Patentees of

Noiseless, Self-Coiling, Revolving Steel Shutters.

Fire and Burglar Proof Also, improved ROLLING WOOD SHUTTERS of various kinds, and Patent METALLIC VENETIAN BLINDS.

Office and Manufactory, - - 162 & 164 West 27th Street New York.

MENDEN & SCHWERTE IRON AND STEEL WIRE WORKS,

AT SCHWERTE, WESTPHALIA, GERMANY.

The largest Wire Works in the world. Make, on 12 trains, STEEL AND IRON WIRE RODS of all dimensions and descriptions.

SCREW, RIVET, NAIL AND CHAIN RODS, SPECIALTIES.

SOLE AGENTS FOR THE UNITED STATES:

WOLTMAN & MICKERTS,

78 William Street, NEW YORK. 5 North Second Street, ST. LOUIS, MO.


The only method, however, which commends itself, says Mr. Atkinson, as being capable of giving a sample that can with certainty be accepted as representative of the whole cargo, is the so-called continuous method of sampling. This consists in taking four or five times during each day that the cargo is being discharged a small sample, in much the same way as in the first method described, representative of the ore exposed at the time the sample is taken. Each sample is crushed and mixed, and a portion of each preserved in an air-tight binn of sheet iron or zinc, to prevent loss or absorption of moisture. When all the samples have been taken, the preserved portions are thoroughly mixed, crushed to the fineness necessary for packing, again well mixed, packed tightly in sample tins, and sealed. It would be perhaps, more systematic still to take a sample after each hundred tons have been discharged, the crushing of one sample being proceeded with while a fresh lot of ore is being discharged, a portion of each sample being preserved as before, and the final sample taken after mixing and crushing the several portions.

This method is the one adopted in sampling cargoes of phosphates or copper and zinc ores, and in most cases of manganiferous iron ores, but has been adopted for iron ores in isolated cases only, it being considered that the extra cost is not repaid by the results. When, however, it is remembered how easily samples may be made to vary to the extent of 2 per cent. in the yield of metallic iron, and when the money value of this difference is borne in mind, it may readily suggest itself to those concerned that steps should be taken to secure fair average samples about which no doubt can exist. If it be considered that having representatives of two parties engaged during three or four days in taking the sample would be an unnecessary and troublesome expenditure of time, an agreement might be made by which the taking of the sample is left to some competent person, recognized as beyond all suspicion of showing a partiality for one side or the other. The cost of proceeding in this manner will doubtless be greater than that of taking the small sample, but when divided between buyers and sellers would be small in comparison with the interests involved.

## Two Boston Fairs.

Two expositions are to be held in Boston this year, each opening in September, which, it is thought, will together make something akin to the world's fair contemplated by Boston a year or two since. One of these is to be a great bazar at which the manufactured goods and art works of all nations are to be on exhibition, and also for sale. The preparations for this experimental mercantile exhibition are so far advanced that some idea may be had of its importance. Europe, Asia, Africa and the isles of the sea will be represented by art works, fabrics of all kinds, curios, and that multitude of things which cunning Parisian confectioners have devised to tickle the palates of all peoples. The products of the best vineyards of Europe, the bog jewelry, linens and woolens of Ireland, the fancy work of France, Germany and Italy, and the strange conceptions of Oriental artists, are to be displayed in much greater profusion than at Philadelphia in 1876. Taken all in all, this bazar of all foreign nations will be a great show and enlarge that taste for household decorative art which was engendered by the Centennial Exposition. This fair is to be held in the large building of the Massachusetts Charitable Mechanics' Association.

A five minutes' walk brings one to the equally extensive building of the New England Manufacturers' and Mechanics' Institute, a corporation in which some 1200 leading manufacturers and merchants of New England are shareholders. The coming fair will be the third held by the institute, and, it is expected, will surpass both its predecessors in its value to the whole country. It may be well to say that this institute was chartered as an educational enterprise, and that its managers have faithfully adhered to the ideas which led to its foundation. They believed that if New England would maintain its long-established reputation as a great hive of manufacturing industries, it must have an institution to which its mechanics and artisans could from time to time resort to see whatever was new in their several callings, and to compare notes with each other as to the merits of so-called improvements in tools, machines and processes. They, therefore, erected their building, supplied it with the needed power and appliances, and then invited the United States to exhibit here annually. Last year they induced several Southern railroad corporations to repeat on a larger scale the exhibits of the natural resources of the South, which attracted great attention and excited no little wonderment at the Atlanta Cotton Exposition. These proved to be the chief attractions of the fair, drawing to it great numbers of people from New England, the Middle States and Canada. Encouraged by the result of that effort, the institute sent invitations to the Southern States to bring to Boston this year full displays of their natural resources, and that they might have a spur to competition; they also invited the several systems of railways which extend from the Mississippi to the Pacific Coast to make similar displays for the States and Territories they traversed. A speedy and cordial response was given to these invitations, and now the evidence of the work that has been done in remote sections of the Union is beginning to be seen in the numberless heavy packages that are daily received at the institute.

The first State to appear through its accredited agent is North Carolina. The Old North State has secured a space 150 by 50 feet in the center of the main floor, and will occupy the whole of it with its timbers, ores, minerals and agricultural products, and with specimens of the skill of its manufacturers. Scientists unite in pronouncing this State one of peculiar interest, because in its vegetation extremes meet and blend, the flora of the temperate and tropical regions of the Atlantic coast both flourishing in its climate and soil. Minerals and ores of nearly every kind also abound, and nearly every metal of commercial importance can be obtained from its mines. In the timber collection gathered from all parts of the State are 100 sections of tree trunks, some of enormous diameter. From the coast counties there are cypress and pine trees, the latter showing the cuttings made at various times by the tupentine distillers. With these there will be a still and all other appliances used in that industry which was once supposed to be the only one in which the North Carolinians ever engaged, and which won for them the old appellation of "tar heels." When the gold, silver, copper, iron and marble which the State authorities have collected and sent to Boston shall all be arranged, the timbers and finished boards put in place, the wheat, corn and other cereals surrounded by the tobacco of the golden belt, and the bottled wines of four vineyards be formed into pyramids, those who visit this fair will have their eyes opened to the fact that "pitch, tar and turpentine" are small items of the great natural resources of North Carolina.

The ladies' committee of the fair have prepared an interesting exhibit of the work of New England women. While not so great numerically as the display made at the Centennial Exhibition in the Woman's Pavilion, it will surpass that celebrated illustration of the skill of our countrywomen in many respects, for it will show how many new avenues have been opened to them and what advances they have made in both artistic and domestic handiwork since 1876. As a part of its educational idea, the institute pays special attention to processes, and at the coming, as in former fairs, it will have a large number of machines in motion, thus showing how many things in common daily use are made. This feature, always attractive to Americans, is peculiarly so to the New England people, who like to know the how, why and wherefore of everything. It has become the practice of many leading manufacturers to send their foreman and skilled workmen to spend a day or two at the fair, the employers paying expenses and continuing wages, in the belief that the knowledge their men acquire will be of sufficient value to their business to more than pay the cost.

## Progress in China.

As a general thing, progress in China is supposed to be non-existent. This, however, says a writer in the *Scotsman*, is not the opinion of those best acquainted with the past history and present doings of the Chinese. Their rate of progress is not ours; they move more slowly, but then the vastness of the body to be moved must be taken into account. China is nearly as large as Europe, and contains a much larger population, every third man in the world being, it is calculated, a Chinaman. Their progress in the past has been most marked. Thus, the Chinese appear to have been among the earliest, if not the very earliest, of the human race to emerge from barbarism. They have a literature older than the days of Moses, and astronomical observations that go back at least to the days of Abraham. Comparing their early progress with that of European nations, they were clothed in silk robes when our savage ancestors still painted their naked bodies. They invented printing and had printed books about the middle of the tenth century, 500 years before the time of Caxton. Gunpowder and the mariner's compass were Chinese inventions long before they were known to Europeans. Lieut. H. N. Shore pointed out, in a recent paper read before the Society of Arts, that, in the matter of canals, the utilization of carrier pigeons, the artificial culture of oysters, fish and poultry, and in the satisfactory solution of the great sewage question, the Chinese have been before us in time, and, in some of these at least, are still ahead of us in results. Their progress in the past cannot be gainsaid; it may, however, be contended that they have now reached the limit of their capacity, and that no further progress need be anticipated. This, to say the least of it, is exceedingly unlikely in a people acknowledged by anthropologists to be the biggest-brained race in the world, while facts are against it, for signs of progress are not wanting among the Celestials of the present day.

The most striking and significant of these is their progress over the globe. Until comparatively recent times, China was a world within a world. It was as nearly as possible self-contained, its Buddhistic religion being the only thing it is known to have borrowed from abroad. The Chinese knew almost as little about, and cared about as little to visit, the outer world as they would had it been a different planet. This is totally changed now. From the chief ports along the Chinese coast a constant stream of emigration flows, and has flowed for many years, with the result that, next to ourselves, they are now the greatest colonists in the world. The climate of Further India, Siam, Malaya, and the vast chain of islands, great and small, extending from Sumatra to Australia, suits the Chinaman admirably, and these are being gradually peopled by this oblique-eyed Mongolian race. Rangoon, in British Burmah, contains 10,000 of them; Singapore, the great commercial capital of Malaya, has 80,000 out of a total population of 95,000; Java has 160,000, while the Straits settlements, according to a recent traveler, "are now virtually Chinese colonies under the British flag." They are not merely numerous in the Malay Archipelago; they are also influential, the commerce of those regions being almost entirely in their hands. In Australia they have obtained a footing, and can make fortunes at the gold diggings by working over again the refuse heaps of the European digger. That they are no mean competitors in the industrial race is seen in the restrictions put on their entrance into the Australian colonies. They have made their way to all the chief groups of islands in the Pacific Ocean, and have now become an influential element in the population of the Sandwich Islands, where they are fast superseding the indolent natives. They have crossed to the New World, and are gradually spreading eastward from California and the Pacific slope. Here they have shown themselves able, and, to judge from the persecution they have been subjected to, more than able, to hold their own against the Americans in the labor market. China

## OGDEN & WALLACE,

85, 87, 89 & 91 Elm St., New York.

**Iron and Steel**

Of every description kept in stock.

Agents for Park Brother & Co.'s

**BLACK DIAMOND STEEL.**

All sizes of Cast and Machinery Steel constantly on hand.

---

## PIERSON & CO.,

24 & 26 Broadway, 77 & 79 New St.,

NEW YORK CITY.

"PICKS" of all kinds,

'ESOPUS" HORSE SHOE IRON,

BEAMS, ANGLES,

Tees, Channels, Sheets, Plates.

All descriptions in stock.

**IRON & STEEL.**

---

## ABEEL BROS.,

190 SOUTH ST., 365 WATER ST., } NEW YORK.

"ULSTER" IRON,

"CATASAUQUA" IRON,

ALLENTOWN SHAFTING,

COMMON IRON,

And full assortment of sizes of the best brands of

**REFINED IRON.**

Band, Hoop, Scroll and Angle Iron. Cast, Spring, Toe-Calk and S. S. Steel

TELEPHONE CALL, "NASSAU, 379"

---

## A. R. WHITNEY & CO.,

MANUFACTURERS OF AND DEALERS IN

**IRON.**

Warehouses: 56, 58 and 60 Hudson St., 93, 95 and 97 Thomas St.

AGENCIES:

PORTAGE IRON CO., Limited, Merchant Iron.
SAMSONDALE IRON WORKS, Merchant Iron.
NORWAY IRON AND STEEL WORKS, Homogeneous Steel Plates.
BAY STATE IRON CO., Tank, Boiler and Girder Plates.
H. P. NAILS CO., Wire Nails.
BRANDYWINE ROLLING MILL, Boiler Plates.
GLASGOW TUBE WORKS, Boiler Flues.
A. M. BYERS & CO., Wrought Iron Pipe.
CARNEGIE BROS. & CO., Limited, Wrought Iron Beams, Channels and Shapes.

Bessemer Steel Shafting, Plain and Polish d.

Plans and estimates furnished and contracts made for erecting Iron Structures of every description. Books containing cuts of all iron made sent on application by mail. Sample pieces at office. Please address 58 Hudson St., New York.

---

## BORDEN & LOVELL,

**Commission Merchants,**

70 & 71 West St.,

L. N. LOVELL, C. A. GREENE, H. L. FREELAND, — NEW YORK.

Agents for the sale of

**Fall River Iron Co.'s Nails,**

**Bands, Hoops & Rods,**

AND

**Borden Mining Company's Cumberland Coals.**

---

## WILLIAM H. WALLACE & CO.,

**IRON MERCHANTS**

Cor. Albany & Washington Sts.,

*NEW YORK CITY.*

WM. H. WALLACE. WM. BISPHAM.

---

## ORFORD COPPER & SULPHUR COMPANY,

**SMELTERS AND REFINERS OF COPPER.**

THOS. J. POPE & BRO., Agents, 292 Pearl St., New York.

Copper Ore, Mattes or Bullion purchased. Advances made on consignments for refining and sale. Smelting and Refining Works at Bergen Point, near New York. *Offices, 37 & 39 Wall St., New York.*

---

## PASSAIC ROLLING MILL CO.,

Manufacture and have always in stock

**ROLLED IRON BEAMS,**

*Channels, Angles, Tees, Merchant Bars, Riveted Work, Forgings, Eye Bars, &c.*

PATERSON, N. J.

Room 45, Astor House, New York.

---

## CUT NAILS.

**Hot Pressed Nuts, Bolts, Washers, &c.**

DOVER IRON CO.'S

**BOILER RIVETS,**

Boiler Brace Jaws, Socket Bolts, &c.

**FULLER BROTHERS & CO.**

139 Greenwich Street, New York.

---

## Marshall Lefferts & Co.,

*90 Beekman St., New York City,*

MANUFACTURERS OF

**Galvanized Sheet Iron,**

*Best Bloom, Best Refined and Common.*

Galvanized Wire Telegraph and Fence; Galvanized Hoop and Band Iron, Grivanized Rod and Bar Iron, Galvanized Nails, Galvanized Chain, Galvanized Iron Pipe.

CORRUGATED SHEET IRON

For Roofing, &c., Galvanized, Plain or Painted

*Best Charcoal, Best Refined and Common*

SHEET IRON.

**Plate and Tank Iron,**

C No. 1, C H No. 1, C H No. 1 Flange, Best Flange, Best Flange Fire Box, Circles.

ALL DESCRIPTIONS OF

Iron Work Galvanized or Tinned to Order.

Price list and quotations sent upon application.

---

## ROME MERCHANT IRON MILLS,

ROME, N. Y.,

Manufacturers of the best grade of

Bar Iron, Bands and Fine Hoops,

Scrolls, Ovals, Half Ovals, Half Rounds, Hexagon and Horse Shoe Iron. Also from Charcoal Pig a superior quality of Iron branded J. G. All puddled balls reduced by hammer. Orders may be sent to the Mill or to J. O. CARPENTER, our Agent, at 59 John Street, New York.

---

## FOX & DRUMMOND,

**RAILWAY**

AND

**ROLLING MILL MATERIAL.**

68 WALL STREET,

NEW YORK.

---

## JAMES WILLIAMSON & CO.,

SCOTCH AND AMERICAN

**PIG IRON,**

No. 63 Wall St., New York.

---

## ULSTER IRON WORKS.

90 Broadway, New York.

---

## Tuckerman, Mulligan & Co

---

## CARMICHAEL & EMMENS

130, 132 & 134 Cedar St., New York, and Nos. 21, 23, 25 & 7 West Lake St., Chicago, Ill.

DEALERS IN

IRON AND STEEL BOILER PLATE.

Lap-Welded Boiler Tubes, &c, &c.

Agent for The Coatesville Iron Co. The Laurel Rolling Mills, and Union Tube Works; Wrought Iron Beams, Angles Tees, Rivets, &c.

---

## PITTSBURGH TOOL CO.,

Successors to

ALKER & CROMLISH,

Twist Drills, Reamers, Taps and MACHINISTS' SPECIAL TOOLS,

Machine, Car and Bridge Bolts, Set and Cap Screws, Boiler Rivets, &c.

LIGHT MACHINE FORGINGS A SPECIALTY.

P. O. Box 1060, Pittsburgh, Pa.

FACTORY:

Corner North & Irwin Avenues, Allegheny, Pa.

---

## VOUGHT & WILLIAMS,

DEALERS IN

Horse Shoes and Horse Nails, Tire, Spring, Toe Calk, Machinery and Tool Steel, Bolts, Rasps, Files, Drilling Machines, &c.

288 Greenwich St., New York.

---

## OXFORD

IRON AND NAIL CO.,

**Cut Nails**

AND

**SPIKES.**

J. S. SCRANTON, Sales Agent,

*81, 83 and 85 Washington Street,*

*NEW YORK.*

---

## JOHN W. QUINCY & CO.,

98 William St., New York,

Anthracite, Charcoal, Scotch and English Pig Iron.

Cut Nails, Ingot Copper, Tin, Lead, and Metals Generally.

---

## HARRISON & GILLOON

IRON AND METAL DEALERS,

558, 560, 562 WATER ST., & 302, 304, 306 CHERRY ST.,

NEW YORK,

have on hand, and offer for sale, the following:

Scotch and American Pig Iron, Wrought, Cast and Machinery Scrap Iron, Car Wheels, Axles and Heavy Wrought Iron; also old Copper, Composition, Brass, Lead, Pewter, Zinc, &c.

---

## BURDEN'S

**HORSE SHOES.**

"Burden Best"

Iron

Boiler Rivets.

The Burden Iron Company

Troy, N. Y.

---

## ULSTER

AND

BURDEN'S

**H. B. & S. Bar Iron.**

Also Best Grades of

American & English Refined Iron.

All sizes and shapes in stock.

EGLESTON BROS. & CO.,

166 South St., 267 Front St., } NEW YORK CITY.

---

FRANK L. FROMENT,

112 John St.,

NEW YORK

**IRON AND STEEL.**

AGENT FOR

Pencoyd Iron Works,
Maidencreek Iron Co.,
Marshall Iron Co.,
Still Water Co., Iron Beams, Hoop & Band Iron.

---

## W. S. MIDDLETON,

**Broker in Machinery & Iron**

Agent for

FORSTER'S CRUSHER & PULVERIZER,

The best in market.

W. S. MIDDLETON, 52 John St., N. Y.

---

## B. F. JUDSON,

Importer of and Dealer in

SCOTCH AND AMERICAN

**Pig Iron,**

Wrought & Cast Scrap Iron,

**OLD METALS.**

457 & 459 Water St., 233 & 235 South St., } NEW YORK.

---

## Manhattan Rolling Mill.

**J. LEONARD,**

445 to 451 West St., 177 & 179 Bank St.,

NEW YORK,

Manufacturer of

HORSE SHOE IRON,

Toe Calk Steel,

Rods, Ovals, Half Ovals and Flats.

---

## DANIEL F. COONEY,

88 Washington St., N. Y.

BOILER PLATES AND SHEET IRON,

LAP-WELDED BOILER FLUES,

Boiler Rivets, Angle & T Iron, Cut Nails & Spikes.

Agency for Glasgow Iron Co., Jos. L. Bailey & Co. Pine Iron Works, Lebanon Rolling Mills, Chester Pipe and Tube Co., Albany & Rens. Iron and Steel Co.'s celebrated Boiler Rivets; Homogeneous Steel Boiler and Fire-Box Plates.

---

## W. D. WOOD & CO.'S

PATENT

**Planished Sheet Iron.**

Patented March 14th, 1865; April 8th, 1873; Sept. 9th, 1873; Oct. 6th, 1874; Jan. 11, 1876.

*Guaranteed fully equal in all respects to the*

IMPORTED RUSSIA IRON,

*and at a much less price.*

FOR SALE

by all the principal

**METAL DEALERS**

In the Large Cities throughout

THE UNITED STATES,

And at their Office,

111 Water Street, PITTSBURGH, PA.

---

## SYRACUSE MALLEABLE IRON WORKS,

SYRACUSE, N. Y.

Mower and Reaper Castings and Carriage Irons a Specialty.

W. B. BURNS, Proprietor.

---

## C. W. LEAVITT,

161 Broadway, NEW YORK

NEW AND SECOND-HAND

**Rails and Railway Equipment**

PIG and BAR IRON, OLD RAILS and SCRAP.

General Agent ALLENTOWN ROLLING MILLS.

Agent for PARDEE CAR & MACH. WORKS.

---

## KINNEIL

**SCOTCH PIG IRON,**

FOR SALE IN LOTS TO SUIT,

EDWARD J. WESSELS

SOLE AGENT FOR THE UNITED STATES,

17 Cedar St., - - NEW YORK.

---

## F. W. JESUP & CO.,

**Railway Supplies and Equipment.**

No. 67 Liberty St., NEW YORK.

Agents NASHUA IRON AND STEEL CO., Manufacturers of

STEEL LOCOMOTIVE TYRES, HOMOGENEOUS STEEL BOILER PLATES, IRON AND STEEL AXLES, CRANK PINS, PISTON RODS, SLIDES, &c.

IRON AND STEEL LOCOMOTIVE FORGINGS.

---

STEEL TOE CALKS.

Extra Quality Homogeneous Steel

**BOILER PLATE**

STEEL PLATES, all descriptions.

Cut Nails and Spikes, Plate and Sheet Iron, all descriptions.

SHOENBERGER & CO., Pittsburgh, Pa.

---

WHEELING

**NAILS**

**Laughlin Nail Co.,**

JUNCTION IRON CO.,

*Joint Yearly Capacity Over*

600,000 KEGS.

*Manager Sales Dep't,*

**W. K. ROSS,**

97 Chambers Street, New York.

---

## KEYSTONE ROLLING MILL, Limited,

Manufacturers of

**IRON**

Pittsburgh, - - - Pa.

---

## Bonnell, Botsford & Co.,

**Iron, Nails & Spikes.**

YOUNGSTOWN, OHIO.

---

CORRUGATED AND CRIMPED IRON ROOFING & SIDING,

*Iron Buildings, Roofs, Shutters, Doors, Cornices, Skylights, Bridges, &c.*

MOSELEY IRON BRIDGE AND ROOF CO.,

*5 Dey Street, New York.*

---

## GLENGARNOCK AND CARNBROE SCOTCH PIG IRON.

For spot delivery, and for prompt or forward shipments to New York, Boston, Philadelphia, Baltimore or New Orleans. For sale by

**JAMES LEE & CO., Sole Agents for the United States.**

72 Pine Street, NEW YORK.

101 Milk Street, BOSTON, MASS. 156 Washington Street, CHICAGO.

---

## LEECHBURG IRON WORKS

KIRKPATRICK & CO.,

Manufacturers of all grades of

**FINE SHEET IRONS,**

Refined Cold Rolled, Show Card, Stamping, Tea Tray, Polished, Shovel, Ferrule Iron, &c.)

NATURAL GAS USED AS FUEL.

*OFFICE, No. 143 First Ave., Pittsburgh, Pa.* *WORKS, Leechburg, Pa.*

---

## CHARLES HUBBARD,

"SHERIDAN," "LEESPORT," "MT. LAUREL" & "TEMPLE" } BRANDS PIG IRON.

"CHARCOAL" PIG IRON, "MAIDEN CREEK" and "NEW RIVER MINERAL" BRANDS.

FAVORITE BRANDS OF SCOTCH PIG IN STOCK AND TO ARRIVE.

Old Car Wheels, Best Brands. *46 Cliff Street, New York City.*

---

## JAMES W. ROSS,

IMPORTER OF AND FURNACE AGENT FOR

**SCOTCH AND AMERICAN PIG IRON.**

MANUFACTURERS AGENT OF

Bar Iron, Car Wheels, Axles, Rails and Railroad Supplies.

SOLE AGENT

**WHITAKER IRON COMPANY,**

OF WHEELING, W. VA., MANUFACTURERS OF

SHEET IRON, TANK AND FIRE BED,

36 DEARBORN STREET CHICAGO.

---

JOHN J. SPOWERS, President. ALEXANDER BURNS, Manager.

## THE JERSEY CITY GALVANIZING CO.,

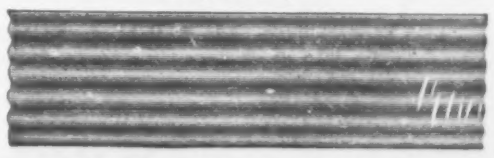
MANUFACTURERS OF

**GALVANIZED MATERIAL OF EVERY DESCRIPTION.**

GALVANIZING IN ALL ITS BRANCHES.

Galvanized Sheet Iron—Best Bloom, Best Refined, Common. Galvanized Round, Square Band and Hoop Iron, &c., &c.

All Sizes of Corrugation from 1¼ to 5 inches.



All Gauges and Sizes of Sheets.

Corrugated Sheet Iron a Specialty, Galvanized, Black and Painted. Iron Corrugated for the Trade. Estimates furnished on application.

WORKS, GREEN AND BAY STREETS, JERSEY CITY, N. J. OFFICE AND WAREHOUSE, 98 JOHN STREET, NEW YORK.

**Siemens' Regenerative GAS FURNACE.**
RICHMOND & POTTS,
119 S. Fourth St., PHILADELPHIA, PA.

**HENRY LEVIS & CO., Manufacturers' Agents**
For Iron and Steel Rails, Car Wheels, Boiler and Sheet Iron and General Railway Equipments.
Old Rails, Axles, and Wheels bought and sold.
*234 S. 4th St., Philadelphia.*

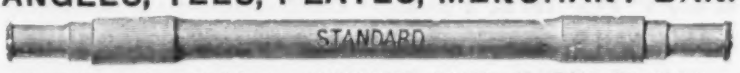
**Cambria Iron and Steel Works.**
The Cambria Iron Co.,
having enjoyed a reputation for more than a quarter of a century for fair dealing and excellence of its manufactures, has now a capacity of
150,000 Tons of Iron & Steel Rails
And most approved patented
Railway Fastenings.
Address
CAMBRIA IRON COMPANY,
218 South Fourth Street, Philadelphia, or at Works, Johnstown, Pa., or Lenox Smith, Selling Agent, 46 Pine St., New York.

The Cambria Iron Co.,
having acquired the entire ownership of the
WIRE AND STEEL MILLS
Of the GAUTIER STEEL CO., Limited, will continue to produce all their specialties, such as Merchant Steel, Plow Steel, Wagon and Carriage Springs, Rake Teeth and Harrow Teeth, Agricultural Implement Steel and
ALL KINDS OF WIRE,
Well-known for superior quality of material and excellence of workmanship.
Address
GAUTIER STEEL DEPARTMENT,
PHILIP E. CHAPIN, Gen'l Sup't, Johnstown.
New York Warehouse, 104 Reade St.
Philadelphia Warehouse, 523 Arch St.

**THE PHŒNIX IRON CO.,**
410 Walnut Street, PHILADELPHIA.
Manufacturers of Wrought Iron
Beams, Deck Beams, Channels, Angle & Tee Bars,
STRAIGHT AND CURVED TO TEMPLATE,
Largely used in the construction of Iron Vessels, Buildings and Bridges.
WROUGHT IRON ROOF TRUSSES, GIRDERS & JOISTS,
and all kinds of Iron Framing used in the construction of Fire Proof Buildings,
PATENT WROUGHT IRON COLUMNS, WELDLESS EYE BARS,
and built up shapes for Iron Bridges.
*REFINED BAR, SHAFTING, and every variety of SHAPE IRON made to order.*
Plans and Specifications furnished. Address DAVID REEVES, President.
NEW YORK AGENTS, MILLIKEN & SMITH, 95 Liberty Street.
BOSTON AGENTS, FRED. A. HOUDLETTE & CO., 19 Batterymarch St.

**ALAN WOOD & CO.,**
MANUFACTURERS OF
Patent Planished, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom
PLATE & SHEET IRON.
No. 519 Arch St., Philadelphia, Pa.
Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack, Tank and Boat Iron; Last, Stamping, Ferrule, Locomotive Headlight and Jacket Iron.

**NAILS** **JAS. ROWLAND & CO.,**
Kensington Iron, Steel & Nail Works,
*920 North Delaware Ave., - PHILADELPHIA,*
Manufacturers of the
ANVIL BRAND REFINED MERCHANT BAR IRON.
Also, the James Rowland & Co. Kensington ★ Nails, cut from their Refined Anvil stock. Also, Plow and Cultivator Steel; Skelp Iron a specialty; also Rounds, Squares, Flats, Bands and Hoop Iron.

PENCOYD IRON WORKS.
**A. & P. ROBERTS & CO.,**
MANUFACTURERS OF
BEAMS, CHANNELS, DECK BEAMS,
ANGLES, TEES, PLATES, MERCHANT BAR.


SHAFTING AND ROLLED OR HAMMERED AXLES OF IRON OR STEEL.
Office, No. 26 S. Fourth St., Philadelphia. Agents for the sale of Glamorgan Pig Iron.

**J. W. PAXSON & CO.,**
DEALERS IN
MOULDING SAND,
1021 North Delaware Avenue, PHILADELPHIA, PA.,

MANUFACTURERS
X MINERAL, XX MINERAL, IXL FACING, CHARCOAL FACING, ANTHRACITE FACING, SOAPSTONE, LEAD FACING, RIDDLES, SHOVELS, STEEL BRUSHES.

**ALLENTOWN ROLLING MILL COMPANY,**
Manufacturers of
Rails, Bars, Axles, Shafting, Fish Bars (Plain and Angle), Spikes, Rivets, Bolts and Nuts, &c. Bridges and Turn Tables.
General Office, 237 South Third St., Philadelphia. Works at Allentown, Pa.

**SHENANDOAH IRON, LUMBER, MINING & MFG. CO.,**
MANUFACTURERS OF
SUPERIOR COKE PIG IRON
FROM NEUTRAL HEMATITE ORES. Also
CHARCOAL PIG IRON AND BLOOMS FROM SAME ORES.
Works at MILNES, PAGE CO., VA. Treasurer's Office, 132 WALNUT ST., PHILADELPHIA.
JUSTICE COX, JR. & CO., Sales Agents' 224 South 4th St., Philadelphia.

LOCOMOTIVE AND CAR-WHEEL WIRES
Manufactured from the celebrated OTIS STEEL BRAND
STANDARD
Quality and efficiency fully guaranteed. Prices as low as any of the same quality. We manufacture Heavy and Light Forgings, Driving and Car Axles, Crank Pins, Piston Rods, &c.
THE STANDARD STEEL WORKS,
Works at LEWISTON, PA.
Office: - - 220 S. 4th St., Philadelphia, Pa.

**Edward J. Etting,**
IRON BROKER AND COMMISSION MERCHANT,
222 S. Third St., Philadelphia, Pa.
Pig, Bar and Railroad Iron.
*OLD RAILS, SCRAP, &c.*
Agent for the
MOUNT SAVAGE FIRE BRICK,
The Allentown Iron Co. and the Greenwood Rolling Mill.
STORAGE WHARF AND YARD
DELAWARE AVENUE ABOVE CALLOWHILL STREET, connected by track with railroad.
Cash advances made on Iron.

Established 1837.
**A. PURVES & SON,**
Dealers in
Scrap Iron, Metals and Machinery,
*Cor. South and Penn Sts., Philadelphia,*
Offer for sale, in lots to suit, Red or Yellow Heavy Scrap Brass; Ingot Brass, best qualities, Ingot Gun Metal made strictly from Old Cannon; Steam Pumps, Shafting Pulleys, &c. Machinery and Tools various descriptions. Cash paid for Scrap Iron and Metals.

ISAAC V. LLOYD. JAS. G. LINDSAY.
**LLOYD & LINDSAY,**
No. 328 Walnut St., PHILADELPHIA,
Brokers and General Dealers in
Iron and Steel, Railway Equipments and Supplies, Bar, Plate and Sheet Iron, Pig Iron, Rails and Fastenings, Muck Bars, Blooms, Boiler Tubes, Wrought Iron Pipe, &c. Old Rails and Scrap Iron.
Florida Yellow Pine, cargo lots.

**J. O. RICHARDSON,**
No. 232 Dock St., Philadelphia,
DEALER IN
Pig Iron, Merchant Bar Iron and Iron Ores.

**Ethelbert Watts,**
IRON BROKER AND COMMISSION MERCHANT,
*No. 326 Walnut St., Philadelphia.*
Pig, Muck and Bar Iron, Scrap, Etc.
Also, COKE AND IRON ORES.

G. A. HEBERTON. S. FRANK SHARPLESS.
**HEBERTON & CO.,**
Selling Agents and Commission Merchants
For the sale of
*Pig, Bloom, Plate, Bar, Scrap, Galvanized, Black, Sheet, Pipe and Railroad*
IRON.
No. 220 So. 3d St., Phila.
Charcoal Bloom and Pig a specialty.

Langhorne Wister. Rodman Wister. J. N. M. Shimer, Late Shimer & Co.
**L. & R. WISTER & CO.,**
IRON BROKERS.
Scrap Iron a Specialty.
Agents for the *Clearfield Fire Brick Co.'s Fire Bricks.*
*No. 230 South 4th St., Philadelphia.*

**ANDOVER PIG IRON,**
FOR BEST MILL PRODUCTS.
*Andover Chill Iron for Carwheels, &c.*
Each pig marked exact chill depth (¼ inch to ¾ inch), A. Whitney & Son's standard test.
F. A. COMLY, Treas. J. WESLEY PULLMAN, Agent.
407 Walnut St., PHILADELPHIA.

**MORRIS, WHEELER & CO.,**
IRON, STEEL & NAILS.
WAREHOUSE and OFFICES, 16th & Market Sts., PHILA., PA. | SALES OFFICES, 400 Chestnut St., PHILA., PA.
New York Address, 14 CLIFF ST.

**MATTHEW GILL, Jr., & CO.,**
(Late of SITES & GILL.)
*1240 N. Ninth St., Philadelphia, Pa.,*
IRON AND METAL DEALERS.
Scrap Iron and Metals, New and Old Rails, Pig and Bar Iron, Railroad Supplies, &c., &c.

**CHEMICAL**
Laboratory for Analysis of Ores of IRON and OTHER METALS,
Pig Iron and Steel, Assay of Gold and Silver Ores.
WATER ANALYSIS, for Boiler and Household use.
REUBEN HAINES,
901 Aurora Street,
(9th, below Locust), Philadelphia, Pa.

**HEATHFIELD, EYRE & CO.**
158 Leadenhall Street, LONDON, ENGLAND.
IRON, TIN PLATE AND METAL MERCHANTS.
Scrap Iron, Old Rails, Pig Iron, &c., &c., quoted at lowest cfi prices. Cable Address "Gentian," London.

JUSTICE COX, Jr. CHARLES K. BARNS.
**JUSTICE COX, JR., & CO.,**
AGENTS FOR
CHICKIES, CONEWAGO, MONTGOMERY AND SHENANDOAH
Foundry & Forge Pig Iron.
CARBON ROLLING MILL CO., Limited, Best Quality Muck Bar.
CATASAUQUA MFG. CO.'S
Bar, Angle, Skelp and Sheet Iron.
Shenandoah (Va.) Best Charcoal Blooms.
*No. 224 So. Fourth St., PHILADELPHIA.*

**BLAKEY & WALBAUM,**
206 S. Fourth St., PHILADELPHIA,
*55 & 57 Pine Street, New York.*
GENERAL MERCHANDISE BROKERS
SPECIALTIES,
NEW AND OLD RAILS,
*BLOOMS, BESSEMER PIG,*
Spiegeleisen Iron Ores
AND RAILROAD SUPPLIES GENERALLY.
Sole Agents for the United States for The North Lonsdale Iron and Steel Co., Limited.
Bessemer Pig Iron, brand "ULVERSTON."
Malleable Pig Iron, brand "U. H. M."
N. B. ALLEN & CO.'S DINAS FIRE BRICKS.

**JEROME KEELEY & CO.,**
*206 Walnut Place, Philadelphia.*
SELLING AGENTS FOR
CHARCOAL and ANTHRACITE BLOOMS, PIG IRON, BAR IRON, SHEET IRON, STEEL and IRON RAILS, IRON CLAD STEEL RAILS and BARS, MAGNETIC and HEMATITE IRON ORES, FIRE BRICK, COAL and COKE. MUCK BARS. Handle Old Iron and Steel Rails, Scrap Iron &c. Examine and negotiate sales of Iron and Coal properties.

**BOOTH, GARRETT & BLAIR,**
ANALYTICAL & CONSULTING
CHEMISTS,
919 and 921 CHANT ST.,
10th St., above Chestnut St., Philadelphia, Pa.
Established in 1836.
Analysis of Ores, Waters, Metals and Alloys of all kinds. A special department for the
Analysis of Iron & Steel,
fitted with all the apparatus and appliances for the rapid and accurate analysis of Iron, Steel, Iron Ores, Slags, Limestones, Coals, Clays, Fire Sands, &c. Agents for sampling ores in New York and Baltimore. Price List on application.

**J. J. MOHR,**
Sole Agent for
Sheridan, Leesport, Temple, Millcreek and Mt. Laurel
BESSEMER, FOUNDRY AND FORGE PIG IRON,
CHARCOAL PIG IRON.
*430 Walnut St., PHILADELPHIA, PA.*

E. H. Wilson. A. Kaiser. J. B. M. Hirons.
**E. H. WILSON & CO.,**
230 South Third Street, Philadelphia.
BROKERS AND DEALERS IN
IRON AND STEEL.
Correspondence solicited.

**EDMUND D. SMITH**
147 So. 4th St., Philadelphia,
BROKER FOR THE SALE OF ALL GRADES
FOREIGN & DOMESTIC IRON ORES,
Spiegeleisen, Pig Iron and Structural Iron.

**J. W. HOFFMAN & CO.,**
Iron Merchants & Railway Equipments.
208 South Fourth St., Philadelphia.
Sole agents Glasgow Iron Co. and Pine Iron Works manufacturers of Muck Bar and all grades of Plate Iron. Celebrated "Glasgow" and "Pine" brands for fire boxes and difficult flanging. Pig and Bar Iron, Rails and all shapes in Iron. Quotations given on Bridge and Building Specifications.

**TESTED CHAINS.**
BRADLEE & CO., EMPIRE CHAIN WORKS,
816 Richmond St., - - - - PHILADELPHIA.
MANUFACTURERS OF THE
Celebrated "D. B. G." Special Crane and Dredging Chains.
Careful attention given to Special Dimension Chains and those requiring extra Strength and Wearing Qualities.

**CUMBERLAND NAIL AND IRON CO.,**
MANUFACTURERS OF
"Cumberland" Nails and Wrought Iron Pipe,
43 North Water Street and 44 North Delaware Avenue, PHILADELPHIA.

**J. TATNALL LEA & CO.,**
Successors to CABEEN & CO.,
IRON COMMISSION MERCHANTS,
No. 400 Chestnut Street, Philadelphia.
BESSEMER, MILL AND FOUNDRY PIG IRON, SKELP IRON, MUCK AND SCRAP BARS NATIVE AND FOREIGN ORES, A. A. HUTCHINSON & BRO.'S CONNELLSVILLE COKE.


men are now also found in the West Indies and British Guiana, while it must not be forgotten that they are spreading westward from China into Thibet, Mongolia and Asiatic Russia. Many of the Chinese return to their own land to spend the evening of their days, where, no doubt, the sight of their wealth forms a stimulant to further emigration, while their accounts of Western civilization, with its telegraphs, telephones and locomotives, must gradually prepare their countrymen for the introduction into China of those improvements in communication. It is as a great colonizing power that China has a very special interest for this country, the reason being, as was recently stated by Sir Rutherford Alcock, that, "taking their numbers and our own, it did not require to carry one's views very far into futurity to see that there would be eventually two races which would occupy the greater part of the world—one was the English-speaking race, which had already filled North America and stretched into the Australian continent and the surrounding islands, and would very soon count up to 200,000,000, and the other was the 400,000,000 of Chinese."

### A Steel Steam Yacht.

Work on the new steel yacht to be built by the Harlan & Hollinsworth Co., of Wilmington, Del., for William Astor, of New York, is to begin at once. The whole hull, including frame, deck beams and the deck itself, is to be constructed of steel. The deck-houses are also to be of steel as high as the windows. She is to be built throughout according to the English Lloyd's rules for sea-going vessels, and with special reference to sea service. To that end she will be provided with a full equipment as a sailing vessel, besides having steam appliances. She will carry a steam launch, built entirely of steel, in addition to the regular equipment of lifeboats provided for such craft. Her dimensions, according to the specifications, are as follows: Length of deck, 227 feet and 5 inches; breadth, 30 feet; molded depth, 20 feet. The machinery will consist of a pair of inverted direct-acting compound condensing engines, with high-pressure cylinders 30 inches in diameter, and low-pressure cylinders, 60 inches in diameter. Both are to have a 36-inch stroke, be able to bear a pressure of 85 pounds of steam, and capable of developing 1400 horse-power. The boilers will be 12 feet in length and 14 feet in diameter, with 160 feet of grate surface, and 4500 feet of heating surface. She will have steam steering-gear, and the screw will be 11 feet in diameter, with a pitch of 17 feet. The boat is guaranteed to make a speed of 14 knots an hour, and it is expected that she will be able considerably to exceed that rate of speed.

The steel decks are to be covered with flooring, and the joiner-work on deck is to be mahogany and teak finished with brass, and the iron companion-ways leading to the various saloons are also to be covered with mahogany. By the plans and specifications the main saloon, ladies' cabin, state-rooms, bath-rooms and other apartments for the use of the owner and his guests are to be situated forward, while the officers' quarters, pantry, store-rooms, galley and cook-rooms will be built in the after part of the yacht. The galley and cook-rooms are to be just aft of the engines, and the pantry close to the forward boiler, while the store-rooms, ice-cellars and tanks, capable of holding 2500 gallons of fresh water, are to be placed in the hold beneath the officers' quarters. The yacht will be supplied with condensers capable of converting 100 gallons of salt sea-water into fresh water daily, and with every other appliance for the safety and comfort of passengers that has been devised by ingenuity or experience. The deck-house over the entrance to the cabin is to be finished in mahogany, and the main saloon, ladies' cabin, state-rooms, bath-rooms, &c., are to be finished in hard woods, and have ceilings finished in hard-wood panels. The ward-rooms and officers' quarters are to be finished in cherry, while the captain's room is to be maple and mahogany. The yacht is to be heated throughout by steam and lighted by electricity, using the incandescent burners of Edison's patent. Electric signal-bells will also be placed throughout the yacht. She is to be finished in the spring of 1884, and will, without doubt, be the finest private yacht in existence. The total cost, including the furniture, is estimated at $350,000.

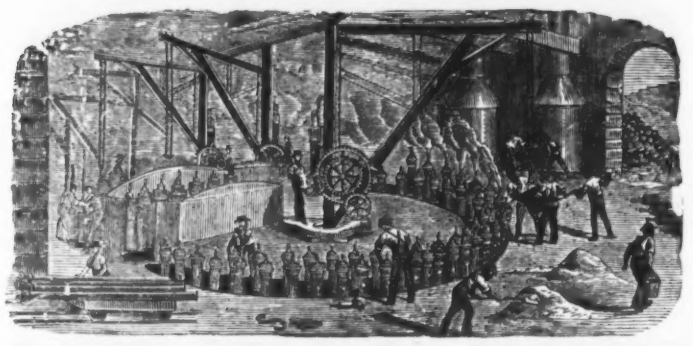
According to an exchange the census of 1880 gives the total area of the United States (not including Alaska) at 3,025,600 square miles, of which 55,600 square miles are occupied by water—lakes, rivers, bays, &c.—leaving 2,970,000 square miles of land, or 1,900,800,000 acres. The total population is 50,155,783. This land, evenly divided, would give to every man, woman and child 37¾ acres, and an onion patch, 3 x 9 rods, over. If we divide the population into families of six persons, each family could be allotted 227 acres. Allowing one-quarter of the land to be mountain ridges, sandy and stony tracts, and other "bad lands," there would still be left the regulation "quarter section" (160 acres) for each family. But the census figures now being made up are for June, 1880. Since then over 1,000,000 people from foreign lands "have come to stay," as American citizens, and the natural increase has been considerable; the total increase from 1870 to 1880 was 3 per cent. per annum. So we had March 1, 1882, nearly 54,000,000 inhabitants. As the area of the land does not expand, there are now less than 36 acres each, or not 152 acres per family, and the average amount is rapidly decreasing. This is no cause for alarm, however. With the the best cultivation, one acre will supply plenty of food for one person, and at this rate we could allow more than 400,000,000 acres for waste land, and still have an acre left for the entire estimated population of the globe, which is somewhat over 1,400,000,000.

Consignments of woven-wire spring beds and barb wire made in Canada were recently shipped to New Zealand, being the first Canadian manufactures sent to that Colony. It is understood that that they will be sold as cheaply as the English or American productions.

# A. H. McNEAL,

BURLINGTON, N. J.

FLANGE PIPES.



General Foundry Work.

## CAST IRON PIPES,

FOR WATER AND GAS.

---

*ESTABLISHED IN 1848.*

# SINGER, NIMICK & CO., Limited,

PITTSBURGH, PA.,

MANUFACTURERS OF ALL KINDS OF

HAMMERED AND ROLLED

# STEEL,

Warranted Equal to any Produced.

**BEST REFINED TOOL CAST STEEL**

For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives, Cold-Chisels and Machinists' Tools generally.

**SAW PLATES**

For Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

**Sheet Steel**

For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws, Stamping Cold, &c., &c.

**SIEMENS-MARTIN (Open-Hearth) PLATE STEEL**

For Boilers, Fire-Boxes, Smoke-Stacks, Tanks, &c.

☞ All our Plate and Sheet Steel being rolled by a Patented Improvement, is unequaled for surface finish and exactness of gauge.

ROUND MACHINERY CAST STEEL

For Shafting, Spindles, Rollers, &c., &c.

*File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.; Cast and German Spring and Plow Steel.*

"Iron Center" Cast Plow Steel.
"Soft Steel Center" Cast Plow Steel.
"Solid Soft Center" Cast Plow Steel.

Finished Rolling Plow Coulters, with Patent Screw Hubs attached.
Agricultural Steel cut to any pattern desired.
Steel Forgings made to order.

Represented at 243 Pearl & 18 Cliff Sts., New York, & 417 Commerce St., Philadelphia, by HOGAN & SON, General Agents for Eastern and New England States.

---

# THE MIDVALE STEEL COMPANY,

CRUCIBLE AND OPEN-HEARTH STEEL.

## TIRES and AXLES

OF EVERY DESCRIPTION.

A. G. TOMPKINS & CO.....Boston
CONGDON, CARPENTER & CO.....Providence, R. I.
H. A. ROGERS.....New York
W. H. WALLACE & CO.....New York
MANNING, MAXWELL & MOORE.....New York

T. GUILFORD SMITH.....Buffalo
CRERAR, ADAMS & CO.....Chicago
POST & CO.....Cincinnati
W. & A. G. SEMPLE.....Louisville
E. H. LINLEY.....St. Louis
GEO. A. SMITH.....Richmond

Tool, Machinery and Spring Steel Castings and Forgings.

*Works and Office,* Nicetown, Philadelphia, Pa.

*Warehouse,* 12 N. 5th St., Philadelphia, Pa.

---

# PHILADELPHIA STEEL FORGE.

PHIL'A TRADE STEEL MARK. FORGE.

"Anvil" Brand Best Refined

## TOOL CAST STEEL

Address all orders to

THE PHILADELPHIA STEEL FORGE, Office, Frankford, Philadelphia, Pa

Agents:

HENRY G. NICHOLS, 14 Platt St., N. Y. City. THE SOUTHERN RAILWAY SUPPLY CO., 15 So. 14th St., Richmond, Va.
General Western Agents, CHAS. I. WICKERSHAM & CO., No. 232 Lake St., Chicago.

---

ESTABLISHED 1847.

# A. WHITNEY & SONS,

PHILADELPHIA,

## CHILLED RAILROAD WHEELS

For every kind of service, including *Street, Mine and Lumber Tramways.* Wheels furnished in rough bored or on axles. Chilled castings made to order.

---

# PENNSYLVANIA STEEL COMPANY,

## Steel Rails, Frogs, Crossings & Switches.

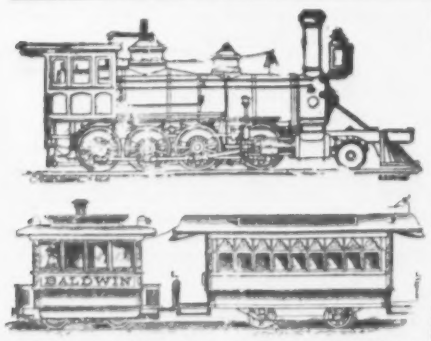
*Forgings for Piston Rods, Guide Bars, Wrist Pins and Machinery Purposes.*

Works at Baldwin Station, Pennsylvania Railroad, near Harrisburg, Pa.

Address all orders to

PENNSYLVANIA STEEL COMPANY, 208 South Fourth Street, Philadelphia.

---




# BALDWIN LOCOMOTIVE WORKS

BURNHAM, PARRY, WILLIAMS & CO., Proprietors,
*Philadelphia, Pa., U. S. A.*

Manufacturers of

**LOCOMOTIVE ENGINES**

of every Description.

Catalogues, photographs and estimates furnished on application of customers.

**NOISELESS STEAM MOTORS,**

For city and suburban Railways.

These machines are nearly noiseless in operation; show no smoke with the use of anthracite coal or coke as fuel, and show no steam whatever under ordinary conditions of service. They can be run at two or three times the speed of horse cars and draw additional cars. Circulars with full particulars supplied.

---

# ROANE IRON COMPANY,

*Manufacturers of and Dealers in*

## Pig and Railroad Iron.

CHATTANOOGA, - - - - TENN.

---

# L. HERNSHEIM,

Manufacturers' Agent and Commission Merchant,
No. 20 Nassau St., NEW YORK.

STEEL RAILS, BLOOMS AND WIRE RODS,
Bessemer, Scotch and Charcoal Pig Iron,
FERROMANGANESE, SPIEGEL IRON, SCRAP IRON, &c., &c.

---

# BRITTON IRON AND STEEL CO.,

MANUFACTURERS OF

IRON AND STEEL BOILER PLATE,

Tank, Bridge and Ship Plates,

BLACK AND GALVANIZED SHEET IRON.

Works foot of Wason St., cor. L. S. & M. S. R. R., *CLEVELAND, O.*

---

# JACKSON IRON COMPANY,

Manufacturers of
Fayette Pig Iron (L. S. Charcoal),
Stewart Pig Iron (Bituminous Coal and Coke),
} Especially adapted for Bessemer, Siemens-Martin Malleable and Car Wheel purposes.
Also, Hammered Blooms, Billets and Muck Bar, extra low in phosphorus, for Siemens-Martin and Crucible Steel. Miners of Jackson (Lake Superior) Iron Ores.

FAYETTE BROWN, Gen. Agent. HARVEY H. BROWN, Asst. Gen. Agent. Offices, 130 Water St.

## HARVEY H. BROWN & CO.,

AGENTS

CHAMPION IRON CO.,
LAKE SUPERIOR IRON CO.
} Lake Superior Iron Ores.

Dealers in Pig Iron, Iron Ores and Old Rails.

*Grand Arcade Building, 101 St. Clair St., CLEVELAND, OHIO.*

---

# CHARLES HUBBARD, 46 Cliff St., New York City,

HEAVY STEEL AND IRON FORGINGS,

For Marine and Stationary Engines.

Homogeneous Steel Boiler Plate, "Nashua" Brand.
Best YORKSHIRE BAR, "TAYLOR" IRON, for Stamped Work, Screws, etc., etc.
MUSHET SPECIAL TOOL STEEL, requires neither tempering nor hardening.
Estimates given.

---

ESTABLISHED 1861.

# Jersey City Steel Works.

JAS. R. THOMPSON & CO.,

Manufacturers of all descriptions of

# STEEL.

Warehouse, 99 & 101 John St., New York.

THOS. C. BURROWS, AGENT.

---

# CALUMET IRON & STEEL CO.,

MANUFACTURERS OF

## OPEN HEARTH STEEL, PIG METAL,

MERCHANT BAR, IRON AND NAILS,

SIEMENS OPEN HEARTH STEEL CASTINGS FOR RAILROAD, MACHINERY AND AGRICULTURAL PURPOSES.

Offices, First National Bank Building, Chicago, Ill.

C. R. CUMMINGS, President.
D. C. BRADLEY, Vice Pres. and Gen'l Man.
J. M. BROWN, Sec'y & Treas.
} Works at Cummings, Cook County, Ill.

---

We are now prepared to make all kinds of

# STEEL CASTINGS

FROM

OPEN HEARTH METAL.

We wish to give special attention to making **Cast Steel Rolls** of all sizes, **Mill Gearing** wherever Cast Steel is suitable. Also **Cranks, Cross Heads, Shafts,** &c., for Steam and Blowing Engine construction.

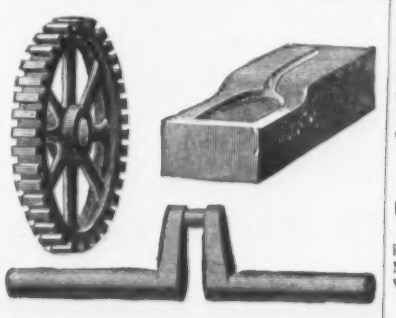
Being desirous of securing a share of public patronage, we will endeavor to make our product equal in quality to any in the market.

## MACKINTOSH, HEMPHILL & CO., Limited,

PITTSBURGH, PA.

---

# SOLID STEEL CASTINGS,



FROM CRUCIBLE and OPEN HEARTH.

HYDRAULIC CYLINDERS AND GEARING SPECIALTIES.

Special Attention given to the production of Tough, Sound, Smooth Castings, true to Pattern and Uniform in Quality.

**GUN METAL ROLLS, PINIONS and CASTINGS.**

AIR-FURNACE REFINED MALLEABLE CASTINGS.

All Stock used by us is subject to Chemical Analysis in our own Laboratory.

## ISAAC C. JOHNSON & CO.,

Established 1853. SPUYTEN DUYVIL, NEW YORK CITY.

---

# CHAS. G. LUNDELL,

No. 7 Exchange Place,
BOSTON,
Mass.

SWEDISH IRON

Representing

Ekman & Co

GOTHENBURG,

SWEDEN.

---

WROUGHT IRON

# Boiler Tubes,

Steam, Gas and Water Pipe.

Oil Well Tubing, Casing and

**LINE PIPE.**

Cotton Presses, Forgings

ROLLING MILL AND

**General Machinery.**

---

# READING IRON WORKS,

261 S. Fourth St. Philadelphia.

---

# THE BOLTON STEEL CO.,

MANUFACTURERS OF

THE BEST REFINED

# TOOL STEEL

AND OTHER FINE GRADES OF

CAST STEEL.

CANTON STEEL WORKS,

CANTON, OHIO.

---

# FIRE BRICK,

Gas Retorts,

CUPOLA AND FURNACE LININGS,

LOCOMOTIVE TILE,

all kinds of Fire Clay Goods and

Double Strength Culvert Pipe

Output for 1882, 32,000 tons. Through cars loaded at factory for all accessible points.

## EVENS & HOWARD,

916 Market St., ST. LOUIS, MO.

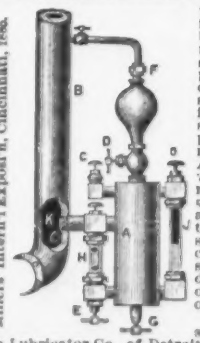
Send for Prices and Freight Rates.

---

# THE DETROIT LUBRICATOR CO.'S

SIGHT-FEED

LUBRICATOR CUPS,




First Prize at Fair American Institute and Millers' Intern'l Exposition, Cincinnati, 1880.

for oiling valves and cylinders of steam engines by the only perfect method, **through the steam pipe.** The oil passes in sight, drop by drop, into the column of steam, where it vaporizes, thus becoming a steam lubricant, oiling perfectly every part reached by the steam. Any clean oil, black or white, light or heavy, may be used. Saves from 50 to 90 per cent. in oil and wear of machinery, thus paying for itself several times a year. A cup will be sent to responsible parties on 30 days' trial if desired. In ordering, give diameter of cylinder.

*Note.*—In our recent suit against the American Lubricator Co., of Detroit, before Justice Stanley Matthews, of the U. S. Supreme Court, involving their "sight feed" feature, a decree was rendered in our favor August 22, 1881. Address,

DETROIT LUBRICATOR CO.
Office, 129 GRISWOLD ST., Detroit, Mich.

Mention *The Iron Age.*

---

VARIETY METAL BOOM.

Iron Foundry and Machine Shop.

STEAM HEATING BY DIRECT RADIATION in all its Branches a Specialty. Brass and other Metal Moulding, Casting and Finishing. Noiseless Vertical Engines, Hydrants, Fire Plugs, &c.

FRAS. B. BANNAN,
Pottsville, Schuylkill Co., Pa.

---

# BASE BALLS, BATS,

AND

UNIFORM MANUFACTURERS.

League and Association Balls, and all Outfits. Fishing Tackle, Tents, Gymnasium Goods, Canoes, Seine Makers. The Rink Roller Skates, Saddle Bags, and Leggins Makers.

166 Main Street, CINCINNATI, OHIO.

B. KITTREDGE & CO.

---

**SILVER & DEMING MFG. CO.,**

MANUFACTURERS OF
Cistern, Pitcher, Well and Force Pumps,
*Wind Mill Pumps,*
HAND AND POWER
**ROTARY PUMPS,**
Hydraulic Rams,
BOILER FEED PUMPS,
**Garden Engines, &c.**
Also, Carriage Makers' Tools, Blacksmiths' Drills, Butchers' Tools, and Feed Cutters.
Write for Catalogue and Prices.
**SILVER & DEMING MFG. CO.,**
**SALEM, OHIO. U. S. A.**

**GIES & Co.**
"LITHOGRAPHERS" AND "PRINTERS"
POSTERS, SHOW CARDS & CIRCULARS. BUFFALO, N.Y. PAMPHLETS & CATALOGUES A SPECIALITY.
BLANK BOOKS MADE TO ORDER. WOOD ENGRAVING AND ELECTROTYPING.

**JOHN MAXWELL,**
Manufacturer of Patented
*BRASS, BRIGHT TINNED WIRE & JAPANNED*
**Bird Cages.**
The cheapest and most saleable in market.
Catalogues and Price Lists furnished to the Trade.
*947 & 949 Pearl St., New York.*

Full size of Band for Brass and Tinned Wire Cages.

**DUNBAR BROS.,**
Manufacturers of
**Clock Springs and Small Springs**
of every description, from best Cast Steel.
*BRISTOL, CONN.*

**Schenectady Molding Sand Co.**
ALBANY AND SCHENECTADY
**MOLDING SAND**
delivered on cars or boats at low rates. All grades guaranteed. All orders will receive prompt attention. Address, **J. G. GREENE, Sec.,**
22 Wall St., SCHENECTADY, N. Y.
G. S. VEEDER, Pres; J. G. GREENE, Sec. and Treas.

**WILLIAMSPORT SAW WORKS.**
SELF-STRAINING.
BEST AND CHEAPEST.

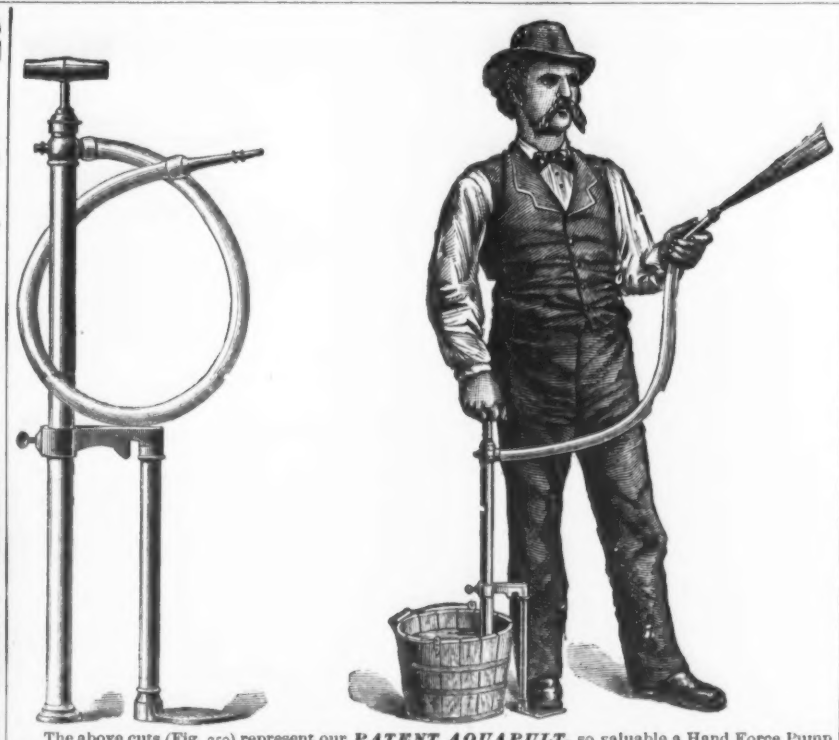
E. ANDREWS & SONS,
WILLIAMSPORT, PA.
Warranted to give Satisfaction.

**CLOTHES WRINGERS.**

Self-Adjusting Steel Elliptic Spring.
T. J. ALEXANDER, Manager,
BOSTON, MASS.

**CHAMPION WASHING MACHINE.**
Agents wanted in every County; the best, cheapest, and the best selling Washer ever invented. It occupies no more room than a wringer; is strong, durable, simple and is easily operated, and saves over half the time and labor in washing. Send for a price list. Large discount to the Trade and Agents. SEAMAN & CO., Milliport, N. Y.

**HAMMER HANDLES.**
Hammer and Hatchet Handles for Tool Makers.
**S. MUSSELMAN & SON,**
QUAKERTOWN, PA., U. S. A.



The above cuts (Fig. 259) represent our *PATENT AQUAPULT,* so valuable a Hand Force Pump that certain competitors have made bold to infringe on same, and even to resort to the crime of plagiarism in using our cuts and trade-mark name of article to decoy customers away from our manufacture and invention; and we caution the trade and customers against purchasing this article when not made by ourselves, as we intend to protect our rights under our patent.

☞ **WE ARE THE ORIGINAL AND FIRST INVENTORS OF THIS STYLE OF PUMP, AND HOLD VALID LETTERS PATENT ON SAME, AND ANY STATEMENT THAT IT HAD BEEN IN THE MARKET PREVIOUS TO OUR MANUFACTURE OF SAME IS OF COURSE ABSURD AND WITHOUT THE SLIGHTEST FOUNDATION IN TRUTH.**

**W. & B. DOUGLAS,** Middletown, Conn.
BRANCH WAREHOUSES:
85 and 87 JOHN STREET, NEW YORK, and 197 LAKE STREET, CHICAGO, ILL.

**UNION MANUFACTURING CO.**

FIG. 114.

☞ That the statement made by a certain manufacturer may not mislead the trade and public, we will say that OUR Hand Force Pump neither infringes their patent nor any other patent, and we are willing to so GUARANTEE, if desired.

FIG. 114 REPRESENTS OUR
**Hand Force Pump.**
It is made of brass, is strong and light, and is the best pump of its kind in the market. Write for prices.

**UNION MANUFACTURING CO.,**
Warehouse, 96 Chambers St., New York. NEW BRITAIN, CONN.

**OLD DOMINION**
**CUT NAILS, BAR IRON.**
Address R. E. BLANKENSHIP
RICHMOND, VA.

GEORGE BROOKE, President. GEO. W. HARRISON, Treasurer.
**THE E. & G. BROOKE IRON CO.,**
Birdsboro, Berks Co., Pa.,
Manufacturers of
**ANCHOR BRAND**
**NAILS AND SPIKES.**
Capacity 1000 Kegs per Day.
*Made from their own Pig Iron, insuring regularity and superiority in quality.*
Also, FOUNDRY AND FORGE
**PIG IRON,**
And Cold Blast Charcoal Car Wheel Iron.

**NATIONAL HARDWARE & MALLEABLE IRON WORKS,**
Lehigh Avenue, American and Third Streets, Philadelphia.
**THOMAS DEVLIN & CO.,**
**MALLEABLE, FINE GRAY IRON AND STEEL CASTINGS** made from patterns to order. Special attention given to Tinning, Bronzing, Coppering, Japanning and Fitting. A large line of Carriage and Wagon Castings constantly on hand for the trade.

**MALLEABLE IRON CASTINGS**
TO ORDER.
Air Furnace Process. Quality Guaranteed. Send for Estimate.
SPECIALTIES IN SADDLERY and WAGON HARDWARE,
**YOUNGSTOWN MALLEABLE IRON COMPANY, YOUNGSTOWN, Ohio.**

**BRIDGEWATER IRON CO., Bridgewater, Mass.**
Manufacturers of
SEAMLESS DRAWN BRASS & COPPER TUBES,
CUT NAILS, HORSE NAILS, FORGINGS, &c.
NAHUM STETSON, Jr., Agent, 73 Pearl Street, New York.


## Industrial Germany.

Mr. Robert P. Porter, in the course of his correspondence to the New York *Tribune*, gives some interesting particulars relative to German iron regions. In a letter from Dortmund, Prussia, under date of June 12, he writes as follows:

"The yearly production of coal of the great Westphalia region, of which Dortmund is the chief town, has risen since 1850 from 2,000,000 to about 25,000,000 tons. In 1860 the production was 4,500,000 tons; in 1870 it was 11,500,000, and last year it reached 25,000,000 tons. This great development, in which the coal-mining industry has kept pace since the year 1850 with the iron and several other branches of manufacture, has given an entirely different aspect to this part of Germany. The principal cities—Essen, Bochum, Dortmund—until then small, antiquated country towns, have grown to be great centers of industries; and formerly insignificant villages such as Oberhausen, Gelsenkirchen, Hörde and Schalke are now the seat of the most important manufacturing industry. In this coal region is found the best coal for coking, and within the district the Connellsville of Germany may be found. The Union Works of this town has no less than 500 coking ovens. The production for sale of all the coking coal collieries amounts to nearly half the product of the district. For some years under free trade the German coal industry was engaged in an energetic struggle against the importation of English coal into Germany.

"On this subject Dr. Gustav Natorp said, soon after the new German tariff came into force: 'We shall succeed within a short time in supplying a large part of the coal consumed on the German coasts of the North Sea and the Baltic from our native mines.' In referring to the tariff and to the attempts in Germany to overcome the prejudice which once existed against native coal, Dr. Natorp said: 'We are fully justified in these endeavors to induce our countrymen to use their native coal.' This is, perhaps, all that need be said on coal mining in Germany, as I have already shown that the new policy has given renewed vigor to the industry, and increased both the pay of the workmen and the number employed.

"The Union Mining, Iron and Steel Works of this city is one of the largest works in the world. It employs in its collieries, iron mines, steel works, and in various other ways upward of 7000 workmen. They have about 20 blast furnaces, and yet to-day are just completing some new ones. The company boast some 300 puddling, welding and heating furnaces, 400 boilers, nearly as many steam engines, 250 forges, &c., and also a Bessemer and Siemens-Martin steel plant. The product last year of coal and coke of this company reached 450,000 tons; iron ore, 95,000 tons; pig iron, 120,000 tons; other iron, 74,000 tons; railway steel, 81,000 tons; other steel, 6000 tons; bridges, 15,000 tons. From this it appears that the Union Company is an important one, and its pay-roll embraces all kinds of labor. Herr Brauns, the manager, kindly permitted me to take from the company's books the average daily wages actually paid to blast-furnace men, the men employed in the Bessemer works, and the puddlers for the year 1882-83. The results were obtained by dividing the aggregate amount paid out during each month of the year for each class of work by the number of men employed; so the results represent what each man actually received every working day of the year. It includes, in piece-work, those that worked steadily and those that lost a day now and then; those that were expeditious and earned good wages, and those that were slow and earned but little. In short, it is a fair average of what each man took home with him. Here are the figures very much condensed:

BLAST FURNACES.

| Description of occupation. | Average daily wages actually paid for 1882-83. |
|---|---|
| Feeder | $0 75 |
| Slagger | .65 |
| Coke filler | .65 |
| Iron filler | .80 |
| Lime filler | .80 |
| Coker | .80 |
| Laborer | .65 |
| Melter | .72 |

"Below are contrasted the actual amounts of money earned per day by the workers in the Union Iron and Steel Works, Dortmund, during the year 1882-83, with the present published rates for similar work in England:

| Description of occupation. | Actual amount earned per day in Germany, 1882-83. | Rate of wages in England—present time. |
|---|---|---|
| Puddler (first hand) | $1.20 | $1.20 |
| Puddler (second hand) | 1.00 | .75 |
| Furnace man (first hand) | 1.30 | 1.60 |
| Furnace-man (second hand | 1.00 | .80 |
| Laborers | .75 | .68 |

"The striking fact is here brought out that common labor in Great Britain is actually sinking below that of Germany, and that skilled labor is either paid the same, or, in one instance, a trifle more. Heaven knows how a man can live in England on 68 cents a day. Truly, as an English writer recently said, '7,500,000 of the population of Great Britain, in spite of the wonderful stories related about its commerce, are to-day toeing the line of pauperism.'

"In the Bessemer Steel Works, at Dortmund, the following average wages were paid in 1882-83:

| Description of occupation. | Average daily wages actually paid, 1882-83. |
|---|---|
| Bessemer steel hands, average wages | $1.00 |
| Hammer-man | 1.30 |
| Furnace-man | 1.10 |
| Rolling mills | 1.35 |
| Laborers | .75 |

I have no figures of an English Bessemer steel works at hand, so no comparison can be made. There would be little or no difference. The workers in the Bessemer works in the United States can best compare the above figures with what they receive. The houses adjoining the works are occupied by the operatives, and many of them owned by the company. Rents are even less than at Essen, and vary, according tosize, from $7.50, $15, $24 and $27 a year. Each house has a garden. It is in the rent that the German workman has such an advantage over his British and American competitors. Lodgings for single men, which mean a bed in a room with others, can be obtained here for 10 pfennigs; dinner, consisting of soup, meat and potatoes, 50 pfennigs; supper, consisting of meat with potatoes or bread, 25 pfennigs; total, 85 pfennigs, which, with 15 pfennigs for beer, would equal 1 mark, or about 25 cents. Thus, for 30 or 35 cents a day, the German laborer can live. The food is coarse, to be sure, but he exists on it."

## New York's Additional Water Supply.

At a recent meeting of the Aqueduct Commissioners, Mr. Thompson was requested to prepare a series of estimates on the cost of building a flume, to measure 4 feet by 4 feet, by means of which this city could be supplied with 30,000,000 gallons of water a day from Croton Lake. The flume was to follow the line of the old aqueduct. It was to be used simply as a means to furnish New York with water while the new aqueduct was in process of construction. A short time since Mr. Thompson submitted the result of his inquiries to the commission in the form of a number of estimates, supplemented by a number of maps. The Commissioner, in presenting the estimates, said that he had found that it would be almost impossible to build the flume described, as the undulations of the country between Croton Lake and this city, together with the masses of rock which would have to be pierced, would interfere with the grade so greatly that the flume could not be made sufficiently strong to withstand the weight of the water. "Then," he added, "the aqueduct properly does not all lie on the surface of the ground, but in many places it consists simply of the right of way beneath farms and gardens, whose owners would seek heavy damages should their land be invaded. The cost in buying rights would be enormous. Again, the square flume would offer too many angles to the force of the water, and it would not stand the pressure. The only practicable flume would be a tubular one, heavily bound and braced with iron." A flume to extend the 33 miles between Croton Lake and this city, similar to the one upon which he had been desired to furnish estimates, Mr. Thompson said, would cost $4.26 a foot, or $442,000 for its total of only 15,000,000 gallons. In order to bring the requisite amount of water to the city a flume with an interior measurement of 20 square feet would be necessary.

According to Mr. Thompson, the only flume that would be of use would necessarily be constructed at a considerable elevation above the aqueduct. As the waterway now is, it is taxed to its utmost, and investigation has shown that in several places the tunnel has been depressed fully 18 inches by the weight of the water. The sinking at one point naturally weakens it at several others, and were an additional weight to be placed on the masonry the results would be disastrous. The elevated flume could be built high enough to make the grade very gradual and the flow of the water regular, but the cost would be very great. At a hight of 50 feet—a very necessary elevation, if the grade is to be regarded—it would cost $2,153,000, and would take from 1½ to 2 years to build. At an elevation of 15 feet the time for building would not be much less, and it would require an expenditure of $1,795,000. The flume could be made very strong with straps and braces of iron, and would resist a pressure of 30 pounds to the square inch. In addition to the cost for the construction of the flume, $400,000 would have to be expended for pumping machinery. It would, therefore, be hardly a profitable venture for the public.

## John Jarrett.

Referring to the recent resignation of Mr. John Jarrett as president of the Amalgamated Association of Iron and Steel Workers, the *Bulletin* of the American Iron and Steel Association remarks:

If we must have trade unions the gentlemen who compose them would do well to always bear in mind that the man who can serve them best as a presiding officer is he who can look on both sides of a controversy; who can mediate as well as fight; who can, when both capital and labor are at boiling heat, give the soft answer that turneth away wrath and withhold the grievous words that stir up strife. Such a man was President Jarrett. He was a peacemaker. That he came toward the end of his presidential term to be so popular with the members of his powerful organization that he could have been unanimously re-elected was largely owing to the fact that his outspoken and consistent opposition to strikes had at last conquered the stormy natures of many of his associates, and commended itself to the judgment of all. He opposed with all his well-known earnestness the great strike of 1882, and those who would not then take his advice learned at a great cost that he was right. They had more faith in him, and more love for him afterwards.

But we are sorry for other reasons that John Jarrett is gone. He is a man of far more than ordinary ability, and with this ability he united as the president of his organization a truly philanthropic and constantly-expressed desire to contribute all that lay in his power toward the physical and moral elevation of workingmen. Thus he inculcated temperance in many of his addresses, and he lived a temperate life himself. He encouraged economy in all things, urged workingmen to buy themselves homes, and commended the public school as the way to honor and usefulness. He was a strong protectionist, and he taught protection to his associates upon every suitable occasion, because he religiously believed that only through its continued ascendency in this country could the condition of our workingmen be prevented from falling to the level of that of European workingmen. With all this our friend Jarrett has always been a gentleman, and we count it something in this world to have this said of a man when he is dead or has retired from public view.

# AUBURN FILE WORKS,

Superior Hand-Cut

## FILES AND RASPS,

MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.

**FULLER BROS., Sole Agents,**

97 Chambers and 81 Reade Streets, N. Y.

---

*Paris, 1878.* *For Superiority.*

## McCAFFREY & BRO.,

PENNSYLVANIA FILE WORKS

Philadelphia, Pa., U. S.

Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

**Superiority acknowledged wherever used, sold or exhibited.**

---

## DETROIT FILE WORKS,

DETROIT, MICH.

MANUFACTURERS OF **FILES & RASPS** The Largest Hand File Works in the U. S.

Send for Catalogue.

Proprietors: ROWE & HAYES, Detroit, Mich.

---

HISCOX FILE MFG. CO., West Chelmsford Mass.

## FILES.

EQUAL TO THE BEST.

Send for Prices.

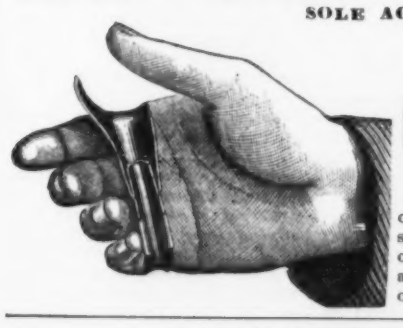
---

## GRAHAM & HAINES, 113 Chambers St., New York

SOLE AGENTS FOR

**UNIVERSAL**

## CORN HUSKER.



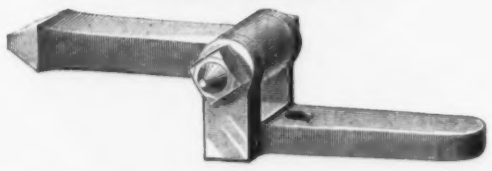
All Metal Adjustable Corn Husker. Made entirely of Brass, without leather straps, loose rings, web or set screws to wear out and render it useless. Only one size which is of importance to the trade, as there are no odd sizes that are unsalable. Send a sample order. Packed one-fourth gross in a box.

---

*(This Advertisement Changed Weekly.)*

## AUBURN PLAIN PATTERN SHAFT COUPLINGS.

Largest Variety of Carriage Forgings made by any House.



1¼ inch, for Heavy Wagons — List per doz. prs. $12.00.

Send for our new Price List of Wagon Hardware.

SEND FOR DISCOUNTS.

Every other variety of Shaft Coupling furnished.

THE E. D. CLAPP MFG. CO., - Auburn, N. Y

---

## PERFORATED SHEET METALS

For Elevators, Malt Kiln Floors, Grain Dryers, Threshers, Separators, Corn Shellers and all kinds of Grain Cleaning Machinery; also for Mining and Concentrating Works, Coal, Coke and Ore Screens, Gas and Water Works, Paper, Woolen, Flour and Oil Mills, Filters, Strainers, Ventilators, etc. PERFORATED TIN AND BRASS of all sizes. Special attention given to work for Railroads and Car-Builders. **Iron, Steel, Copper, Brass and Zinc Punched to any size and thickness required.** Correspondence solicited.

THE HARRINGTON & KING PERFORATING CO.,

Main Office and Works, Nos. 43 to 51 S. Jefferson St., CHICAGO.

Branch Office, 100 Beekman St., New York.

---

## TACKS, NAILS & RIVETS.

Swedes Iron Upholsterers Gimp, Lace and Card Tacks. Black and Tinned Trunk and Clout Nails, Finishing Nails and Brads; Shoe Nails of Swedes and Common Iron; Copper, Brass & Steel Lining & Saddle Nails; Tufting Nails & Tufting Buttons; Brass and Iron Wire Nails, Molding Nails, Escutcheon Pins, Black and Galvanized Regular and Chisel Pointed Boat Nails.

*New York Salesroom, 116 Chambers Street.*

AMERICAN TACK CO., Fairhaven, Mass.

---

# Nicholson FILES.

Bandsaw Files,
Boot Heel,
Brass,
Cabinet,
Cant,
Cotter Taper,
Cotter Equaling,
Cross or Crossing,
Doctor,
Drill,
Feather Edge,
Finishing,
Flat,
Flat Equaling,
Flat Wood,
Gang-Edger,
Ginsaw,
Gulleting,
Half-Round,
Half Round Wood,
Hand,
Hand Equaling,
Handsaw Blunt,
Handsaw (Double-Ender),
Handsaw Taper, single-cut,
Handsaw Taper, double-cut,
Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
Lead Float,
Lightning,
Machine Mill,
Mill,
Mill Blunt,
Mill Pointing,
Pillar,
Pitsaw,
Reaper,
Roller,
Round,
Round Blunt,
Slotting,
Slim Handsaw Taper,
Square,
Square Blunt,
Square Equaling Files,
Stave Saw,
Three-Square Files,
Three-Square Blunt Files,
Tumbler Files,
Union Cut,
Warding Files,
Warding Blunt File,
Warding Round Edge File.

## RASPS.

Baker's,
Beveled Edge,
Bread,
Cabinet,
File, Flat and Half-Round,
Flat Shoe,
Flat Wood,
Half-Round Shoe,
Half-Round Wood,
Horse, Plain and Tanged,
Horse Mouth,
Jig,
Oval or French Shoe,
Racer, Plain and Tanged.

## SPECIALTIES.

Butchers' Steels, Improved,
Bent Rifflers, Handled,
File Cards,
File Brushes,
Machinists' Scrapers,
Stub Files & Holder, Detachable.
Surface File Holder,
Vise File Holder.

---

## NICHOLSON FILE CO.,

PROVIDENCE, R. I.,

SOLE MANUFACTURERS.

---

# BLACK DIAMOND FILE WORKS

G. & H. Barnett, 21 to 43 Richmond St., Philadelphia.

---

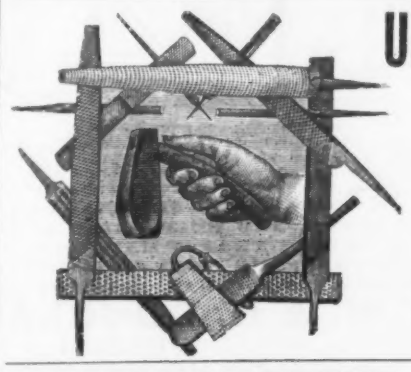
## CHARLES B. PAUL,

Manufacturer of HAND CUT FILES.

Warranted **CAST STEEL.** 187 Tenth Street, Williamsburgh, New York.

All descriptions of Files made to order. Price List mailed on application. Established 1863.

---



## UNION FILE WORKS,

311 to 315 North St.,

BALTIMORE, MD.,

Manufacturers of

## FILES AND RASPS

Made from the Best Refined Cast Steel.

With all the requisite facilities to produce a first-class article, we are enabled to offer Files that will give entire satisfaction.

**MORITZ & KEIDEL, Agents,**

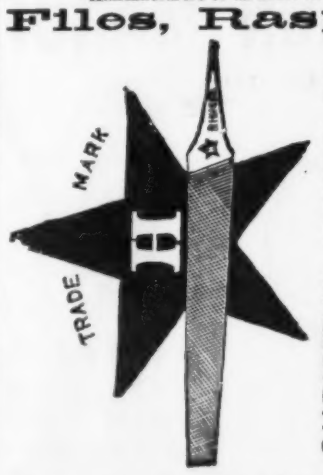
*43 & 50 German St., Baltimore, Md.*

---

**THRIFT FILE WORKS,**

Manufacturers of all kinds of

**Files, Rasps.**




CHRISTIAN HENSSLER, 426, 430, 432 & 434 Ireland St., PHILADELPHIA, PA.

Unexcelled in quality. Full weight and size.

---

HAND-CUT **FILES** Established 1868

**JOHNSON & BRO.**

No. 1 Commercial Street, Newark, N. J.

---

The Patent Combined

**Dinner Pail and Lantern.**

The most perfect Dinner Pail in the world. Hot coffee for dinner and a Lantern at night.

Manufactured by JOS. HAIGHT, PORT CHESTER, N. Y.

Sent by express on receipt of $1.00. Agents wanted.

---

## STOVE REPAIRS.

Repairs for Stoves made at Troy, Albany, Rochester, Cleveland, Buffalo, Boston, St. Louis, Quincy, Chicago, Milwaukee and elsewhere, at W. C. METZNER, 127 W. Randolph St., Chicago, Ill.

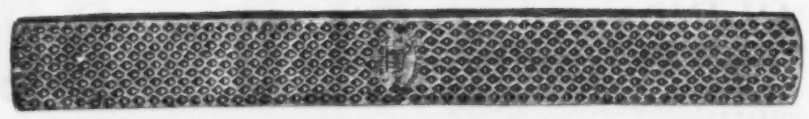
---

## HELLER & BROS., Newark, N. J.,

Manufacturers of the

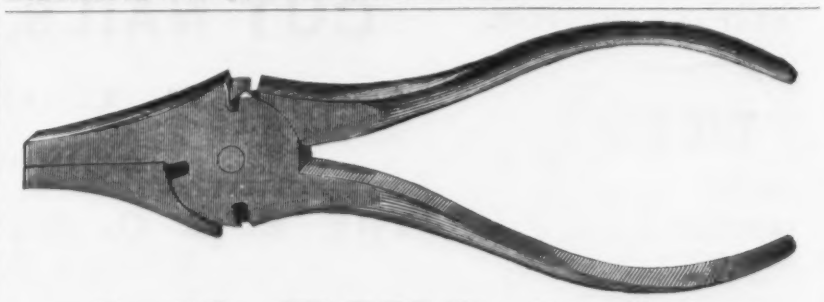
Celebrated American

## HORSE RASPS AND FILES,



Made of the best American Steel, and warranted to be unequaled in the market. For sale by Iron and Hardware dealers throughout the United States and Canada.

---



## J. M. KING & CO.

WATERFORD, N. Y.,

Manufacturers of the **BUTTONS PATENT**

## "WIRE CUTTER AND PLIER COMBINED."

**Specially Adapted for Use on Wire Fence.**

Also Manufacturers of

**Blacksmith and Machinists' Stocks and Dies, Plug and Taper Taps Hand, Nut and Screw Taps, Pipe Taps and Reamers.**

Price List on application. Established by DANIEL B. KING, 1820

---

## LIGGETT SPRING AND AXLE CO.,

**LIMITED,** MANUFACTURERS OF

## SPRINGS AND AXLES

**For Coaches, Phaetons, Buggies, Wagons, &c.**

**Pittsburgh, Pa.**

---

BEST WOOD TURNING IN THE WORLD. RIPLEY MF'G CO. UNIONVILLE CONN.

## HANDLES FOR MANUFACTURERS.

From Selected Stock, Thoroughly Seasoned, Well Made.

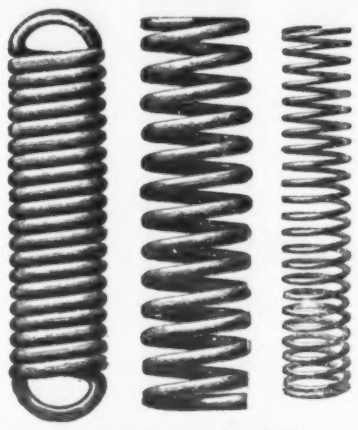
Orders solicited from close buyers who want good work

RIPLEY MANUFACTURING CO.,

**Unionville, Conn.,**

Manufacturers of

*"Common Sense" Mouse Traps, Mallets, Porcelain-Lined Lemon Squeezers, Boot Jacks, Faucets and Hardware.*



Tempered Steel

**SPIRAL SPRINGS,**

Of all sizes and descriptions, made to order by

**John Chatillon & Sons,**

91 and 93 CLIFF ST., N Y.

Our Springs are used by the U. S. Government and various Meterological and other Scientific Institutions.

THE

**Greenfield Vertical Engine**

is unequaled by any other in workmanship and quality of material.

2½ to 30 horse-power.

Prices lower than any other first-class engine.

COOKE & CO.

DEALERS IN

MACHINERY

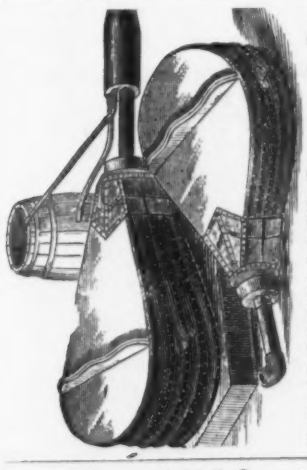
AND

SUPPLIES,

22 Cortlandt St.

NEW YORK.

*In writing, p ease mention this paper.*



WM. FLACCUS & SON, Pittsburgh Pa.
Manufacture every variety and all sizes
**Blacksmith's Bellows**
Superior Quality, covered with best Oak Leather Tannage.

**Grant Fan Mill & Cradle Co.**

Manufacturers of

Grant's Grain, Coffee, Rice, Cochineal and Pimento Fans,

and

TURKEY WING GRAIN CRADLES,
4, 5 and 6 fingers.
GRAPE VINE GRAIN CRADLES
4 fingers.
SOUTHERN PATTERN GRAIN CRADLES,
4, 5 and 6 fingers.
All of a superior quality
None genuine unless marked *Grant Fan Mill and Cradle Co.*
Send for illustrated catalogue and price list.
P. O. Address,
MELROSE, Kensselaer Co N. Y

**GEORGE W. BRUCE,**

*1 Platt St., New York,* Proprietor of the

ATLANTIC SCREW WORKS,

Agent for the

*Florence Tack Co.* and

*C. A. Maynard,*

MAYNARD'S C. S. Planters', Hilling, Bog and Handled Planters, Cotton and Field Hoes.
BRADE'S Crown, Planters' and Hilling.
ELWELL'S Weeding, Planters' and Grub, and a variety of other Kinds for Home and Export Trade.

**ESTERBROOK'S STEEL PENS**

Leading Numbers: 14, 048, 130, 333, 161

For Sale by all Stationers

THE ESTERBROOK STEEL PEN CO.,

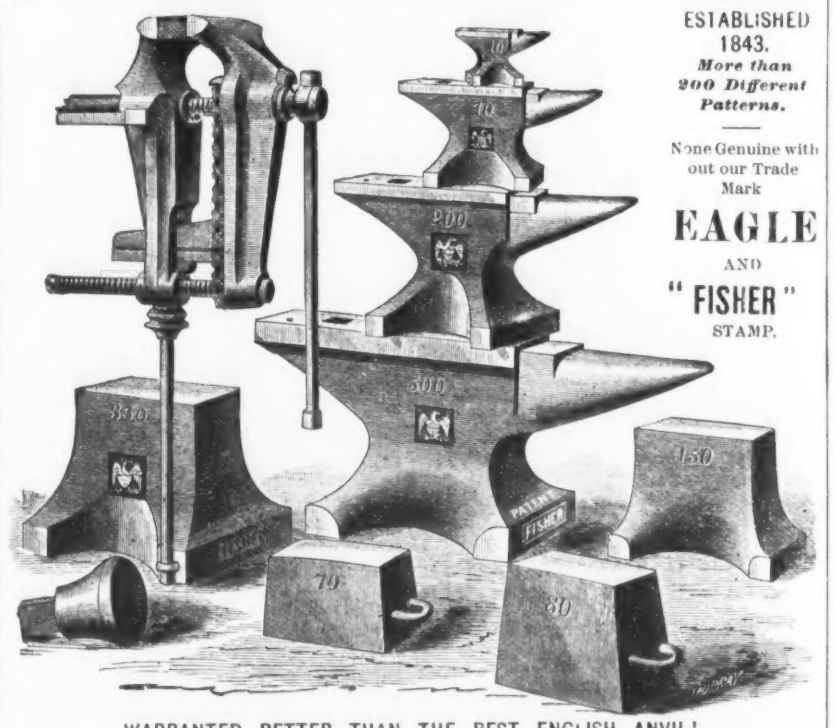
Works, Camden, N. J. 26 John St., New York

DOG COLLARS AND FURNISHINGS.

Send for Illustrated Catalogue.

MEDFORD FANCY COODS CO.,

101 Chambers St. cor. Church New York.



ESTABLISHED 1843.

*More than 200 Different Patterns.*

None Genuine without our Trade Mark

**EAGLE**

AND

**"FISHER"**

STAMP.

WARRANTED BETTER THAN THE BEST ENGLISH ANVIL!

Face in one piece of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true, of the best temper and never to come off or "settle." Horn of tough *untempered steel*, never to break or bend. *Only Anvil made in United States fully warranted as above*

**FISHER DOUBLE-SCREW VISE**

IS FULLY WARRANTED STRONGER THAN ANY OTHER LEG VISE, AND ALWAYS PARALLEL. Is the best Vise for Machine Shops and Blacksmiths, and for all heavy work. ACCURATE AND DURABLE. Send for Circular.

**EAGLE ANVIL WORKS, Trenton, N. J.**

**RICHARD DUDGEON,**

No. 24 Columbia Street, New York.

Maker and Patentee of the improved

Hydraulic Jacks

AND

Punches.

Roller Tube Expanders and Direct Acting Steam Hammers

Communications by letter will receive prompt attention.

*Jacks* for pressing on Car Wheels or Crank Pins made to order.

**ANSONIA BRASS AND COPPER CO.,**

MANUFACTURERS OF

**PURE ELECTRIC WIRE,**

For Magnets, Telegraphs, Telephones, &c.

Insulated on the bare wire with H. Splitdorf's patented Liquid Insulation, covered with cotton or silk

All sizes of Bare and Covered Wire in Stock.

The conductivity of every bundle tested and warranted.

**THE ANSONIA WROUGHT GONGS.**

*For Clocks, Indicators, Telephones, Call Bells, Bell Punches, Steamboat and Railroad Use. Burnished or Nickel Plated.*

ANSONIA BRASS AND COPPER CO., 19 Cliff St., New York.

**THE ESSEX HORSE NAIL CO., Limited.**

**THE ESSEX HORSE NAILS**

Are drawn from the Best Norway Iron Rods only. They are hot forged and cold-pointed, rendering them both tough and stiff, and are warranted

**FIRST-CLASS IN EVERY RESPECT.**

By the use of improved machines we forge *Fifty per cent. More Nails* on a machine than any other company, and are thus enabled to sell them proportionately *less* than any other nail of *equal quality*. All nails branded ESSEX fully guaranteed.

GENERAL AGENTS:

**HOWE & CO., Troy, N. Y.**

**Stanley Rule & Level Co.,**

MANUFACTURERS OF

**Improved Carpenters' Tools.**

FACTORIES,
New Britain, Conn.

WAREROOMS,
29 Chambers St., New York.

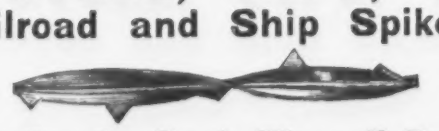
Manufacturers of **Bailey's Patent Adjustable Planes.**
General Agents for the sale of **Leonard Bailey & Co.'s "Victor Planes."**
Manufacturers of **"Defiance" Patent Adjustable Planes.**

**C. W. & H. W. MIDDLETON,**

Office, 945 Ridge Ave., PHILADELPHIA.

**IRON, STEEL, PIPE, NAILS,**

**Railroad and Ship Spikes.**

AGENTS  FOR

**Allis Patent Steel Buck Thorn" Barb Fence.**

MANUFACTURERS OF

GENUINE BRONZE, BRASS, AMERICAN BRONZED AND JAPANNED

**HARDWARE,**

Rim and Mortise Locks, Knobs and Escutcheons,

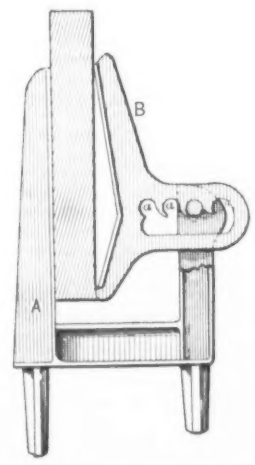
Apple Parers, Registers, Bronze and Cast Butts,

STATIONERS' HARDWARE, &c.,

**READING HARDWARE CO., Reading, Pa.**


### The Crispin Bench and Saw Clamp.

The Reno Bench Vise Co., of Detroit, Mich., are offering what is known as Crispin's adjustable bench and saw clamp, a device calculated to meet a long-felt want among carpenters and builders, and which is clearly shown in the two engravings herewith. It takes the place of a wooden or iron vise permanently attached to a work-bench, and which is useless unless the mechanic is at work in the immediate vicinity of the bench. Inasmuch as this clamp is portable and is easily put in position, it may be used on a




*The Crispin Bench and Saw Clamp.*

scaffold or in any other position about buildings. In Fig. 1, the parts of which the device consists are clearly shown, while Fig. 2 shows the means of using it in connection with a common plank for a base. It is represented as holding a board for planing or sawing. The weight of the article is only 1½ pounds. There are no loose pieces to get lost. It is always available for use and is well adapted for carrying in a common tool-chest. This vise is adapted for clamping boards from ¼ inch to 2¼ inches in thickness. A special feature is its usefulness while fitting doors. Secured by the socket pins to a piece of 2 x 6 laying on the floor, it affords a convenient means for holding the door in position while it is planed down to the scribing. These goods are made from the best quality of malleable iron, and the manufacturers state are so tough that they cannot be broken by a blow with the hammer. The clamp may also be used to hold a saw while filing. Messrs. C. O. Le Count & Co., 29 Chambers st., New York, are general agents.

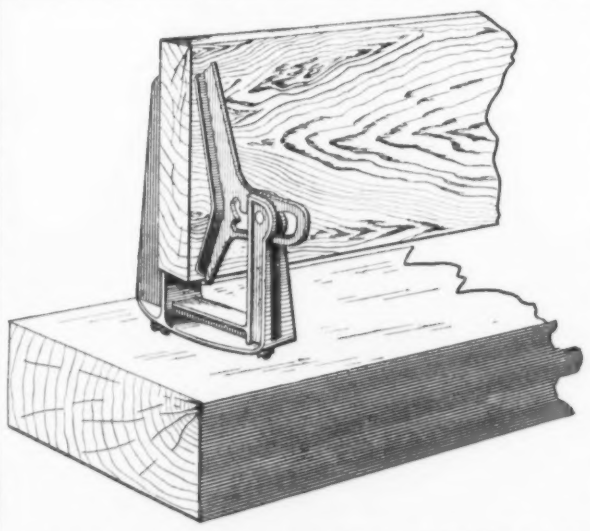


*Fig. 2.—The Clamp Mounted on a Beam and Holding a Board for Sawing or Planing.*

### Railroad Hospitals.

According to the Chicago *Railway Age*, the Union Pacific Railway Hospital at Denver has been built by monthly contributions of 50 cents each from each employee of that road in Colorado and Western Kansas, and is designed for the use of those in the employ of the company in those districts. When the building is completed the monthly payments will probably be lowered to 25 cents. The company itself provides a fund for the care of injured passengers. The building is 126 x 60 feet, two stories in hight, with basement and attic, and will cost $25,000. It contains three wards, each with a capacity for 20 patients, and also several separate rooms. In the basement is a billiard-hall and smoking-room 20 x 40, and on the first floor will be a well-supplied library. There are bathrooms on each floor, good ventilation, broad stairs and elevators, and a side track runs to the rear door, where patients can be transferred from the hospital car, which is soon to be built. With very few exceptions, this and similar institutions are heartily supported by railway employees. Those of the Union Pacific in Utah, Wyoming, Idaho and Montana have petitioned for the establishment of a hospital like that at Denver, and the employees of the Oregon Short Line are endeavoring to create a hospital fund. The success of the plan adopted by the Baltimore and Ohio is well known. This adds to the treatment and support of wounded or sick employees the payment to the heirs of a considerable sum in case of death. The report for July of the Employees' Relief Association of the road last named shows that benefits were paid to 610 members. The sum of $5800 was paid to the representatives of 10 members who died, the amounts ranging from $200, paid in behalf of apprentices, to $1500 paid to the heirs of a conductor. Three of these deaths resulted from accidents and seven from disease. The existence of such associations and the establishment of hospitals where railway employees, when sick or injured, will enjoy the best of scientific treatment and skillful nursing, and have as clean and pleasant surroundings as the wealthiest people in the land, cannot fail to exert a beneficial effect upon the *morale* of the service.

### The Varieties and Formations of Quartz.

In a recent issue of *Science Gossip*, Mr. J. Magens Mello gives an instructive sketch of the principal varieties of quartz, the modes of its occurrence and of its formation, from which we quote as follows:

Quartz is in its many forms probably the most abundant, as well as one of the most beautiful, of all the various minerals which enter into the formation of the earth's rocky surface. The oxide of silicon, which is never found in a free state in nature, constitutes silica, the chemical name for quartz and all its varieties. Its pure crystallized form is familiar to us as the colorless and transparent rock crystal. As rock crystal, the typical form of quartz is an hexagonal prism terminated at each end by a rhombohedron; when broken it will be seen to have a conchoidal or splintery fracture. Rock crystal is very widely distributed, being found in rocks of all ages. The most beautiful and perfect specimens are usually obtained from large cavities or geodes in the older igneous rocks, and also from veins in these and other rocks. The size and color of quartz crystals vary greatly; some are so small as to be microscopical, while others are of very considerable bulk. In the Museum of Berne may be seen specimens of both the clear rock crystal and also of black or smoky quartz upward of a foot in length; there are also some very large ones in the British Museum. Quartz crystals are often found presenting almost every shade of color—yellow, brown, black, red, blue, violet and green. Various names have been given to these colored varieties. The violet, blue, and some of the yellow, and even of the white crystals, which, when fractured, are seen to have a peculiar undulated structure, which Sir D. Brewster pointed out, have been classed together as amethysts, a name often popularly restricted to the violet crystals, which owe their beautiful tint to the presence of oxide of manganese. Violet amethysts are not uncommon in the geodes occurring in volcanic rocks in many localities, but the finest are obtained from Siberia, Persia, India and Ceylon, while Brazil yields white and yellow amethysts. The yellow and brown crystals known as cairngorms are varieties of rock crystal or of crystallized quartz, if we restrict the term rock crystal to the clear, colorless specimens. The darker brown and black crystals, as well as those designated as cairngorms, may be grouped under the common name of smoky quartz. The dark green quartz is called prase, and is colored by amphibole; there is also a lighter green species, known as chrysoprase, tinted it is said by oxide of nickel, while oxide of iron probably gives color to the numerous red varieties. The common milk-white quartz, which is the ordinary quartz of veins and of quartz rock, will be found, on microscopical examination, to be really transparent, but so full of minute cavities as to cause it to assume its milky opacity.

Quartz rock, or massive quartz, is often found in mountainous masses, hundreds of feet in thickness. Many of the quartz schists and micaceous schists consist chiefly of quartz irregularly split up by thin leaflets of mica. Sandstone rocks, often consisting of little besides more or less rolled grains of quartz, will have been derived from the breaking up, under various denuding agencies, of rocks in which quartz has been the prevailing mineral. Veins of quartz have already been mentioned. These are very frequent in the old slate and schist rocks, sometimes forming broad and irregular bands; at others, mere threads traversing the other materials. Such veins will often present open spaces in which the quartz will be found regularly crystallized. Flint and chert are forms of quartz usually occurring as concretions in limestone rocks; sometimes, however, as bands of considerable thickness. The black color so common to the flints of the chalk formation and to the chert nodules and bands in the mountain limes one is due to the presence of carbon. Hornstone is merely a variety of chert. Chalcedony has been described as a mixture of crystalline and amorphous quartz; its tendency is to assume a botryoidal or stalactitic form, and its numerous variations of color and modes of occurrence have led to the adoption of different distinguishing names. Carnelians and sardes are only color distinctions of chalcedony, and the immense family of agates, including the onyx and sardonyx, is more or less composed of chalcedony, disposed in layers, regular or irregular, and combined with other forms of quartz, such as amethyst, jasper, &c. This latter name is applied to an aluminous variety of quartz; it is opaque, and has a less crystalline appearance than ordinary quartz. It is very varied in color; some beautiful red, brown and green-banded stones are obtained in Siberia, in Egypt and elsewhere. Bloodstone is considered to be a mixture of chalcedony and jasper, colored by metallic oxides. One of the most beautiful forms of quartz is opal, which is nothing more than amorphous silica combined with water, which has filtered out from the rocks—usually igneous ones—and is found in cavities and fissures in those rocks. Bohemia, Hungary, Auvergne and Queensland yield opals—some of them of great beauty and value.

Having thus briefly pointed out the principal varieties of quartz and the modes of their occurrence, we will next turn to the history of their formation. We shall find that quartz may have been formed by more than one

## Cutlery.

INFRINGEMENT OF JOHN WILSON'S TRADE MARK, MASSACHUSETTS, U.S.A.

JOHN WILSON'S
BUTCHERS' KNIVES,
BUTCHERS' STEELS,
and
BHOE KNIVES.

TRADE MARK

REGISTERED IN ENGLAND, WASHINGTON, U.S.A., AUSTRALIAN & OTHER BRITISH COLONIES, & GERMANY.

**ACKNOWLEDGMENT AND AGREEMENT.**

"WHEREAS, I, GEORGE A. ROBINSON, of West Mansfield, County of Bristol, State of Massachusetts, have heretofore manufactured and sold certain Knives bearing a Mark which is claimed to be an imitation of the trade-mark owned by John Wilson, of Sheffield, England, which consists of four peppercorns and a diamond, under the mistaken belief that I had the right to do so.

NOW, This, is to Witness, that, in consideration of the forbearance of the Representatives of the said John Wilson to sue me for damages for the wrong aforesaid, I do hereby undertake and agree,

FIRST, to surrender and deliver to the Attorneys for the said John Wilson, all knives now on hand, and in my possession, or under my control, bearing the said imitation trade-mark, and

SECOND, I further undertake and agree to and with the said John Wilson, and his legal representatives, not to manufacture or sell, or cause to be manufactured or sold, at any time in the future, Knives or other Cutlery, bearing his trade-mark aforesaid, or any imitation or simulation thereof. IN WITNESS WHEREOF, I have hereunto set my hand and seal at West Mansfield, aforesaid, this thirty-first day of May, 1883.

WITNESS:— E. M. REED." *(Attorney for Defendant.)* G. A. ROBINSON. L.S.

Imitation ☆0 J.WILSON SHEARSTEEL Mark.

WORKS:—SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750.

**J. R. TORREY,**
Manufacturer of Razor Strops & Dressing Cases.
**Sole Agent for Worcester Cutlery Co.**
**Importer of Fine Razor Hones.**

**American Made Razors.**
WARRANTED BEST CUTTERS IN THE WORLD.
**J. R. TORREY RAZOR CO.**
**Factories: WORCESTER, MASS.**
Send for Price Lists.

# SPENCER & UNDERHILL,

*94 Chambers Street, New York,*

DEPOT FOR

## AMERICAN SCREW COMPANY'S

Wood, Machine and Rail Screws, Stove and Tire Bolts. Rivet

**Also, O. AMES & SON'S Shovels, Spades and Scoops,**

**E. W. Gilmore & Co.'s Strap & T Hinges.**
**W. & S. Butcher's Chisels, Plane Irons, &c.**
**A. Field & Son's Tacks, Brads, Nails, &c.**
**Brade's Brick Trowels.**
**G. F. Warner & Co.'s Carriage Clamps.**
**Nicholson File Co.'s Files.**
**Russell Jennings' Augur Bits.**
**Richardson Bros.' Saws.**
**Germantown Tool Works' Warranted Hammers and Hatchets (Stamped Geo. Selsor & Co).**
**Collier's Sons' Awls.**

GENERAL HARDWARE.

## Cutlery.

CORPORATE MARK

**Joseph Rodgers & Sons'**
(LIMITED)
**CELEBRATED CUTLERY,**
**No. 82 Chambers Street, New York**
**F. & W. CLATWORTHY, Agents,**

The demand for **Joseph Rodgers' & Sons'** productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam-power.

To distinguish Articles of **Joseph Rodgers & Sons'** Manufacture, please to see that they bear their Corporate Mark.

**ESTABLISHED 1836.**

## ALFRED FIELD & CO.,

93 Chambers and 75 Reade Streets,
**NEW YORK,**
**SOLE AGENTS FOR**

Ely Bros., Caps, Wads, &c.,
Joseph Elliot & Sons, Razors,
Isaac Greaves, Sheep Shears, &c.,
Robert Sorby & Sons, Sheep Shears, &c.,
Edward Elwell, Hoes, &c.,
R. & J. Linacre, Grass Hooks and Sickles,
Webster & Horsfall Steel Wire,

GENERAL AGENTS

Western File Co.'s American Files.

HEADQUARTERS FOR

**ANVILS CHAIN CUTLERY, GUNS &c. &c. &c.**

**A. F. BANNISTER & CO.**
SUCCESSORS TO
**FURNESS, BANNISTER & CO.**
ANUFACTURERS OF

**TABLE CUTLERY,**
Cor. Nassau & Sheffield Sts., NEWARK, N. J.

## Cutlery.

## SHEARS AND SCISSORS.

## J. WISS & SONS,

MANUFACTURERS OF ONLY BEST QUALITY

**TAILOR SHEARS,**
*Straight and Bent Trimmers,*
BARBER SHEARS, TINNER'S SNIPS,
&c., &c.,
**26 Bank St., Newark, N. J.**

**THREE PRIZE MEDALS.**

PARIS, 1855. PARIS, 1878.

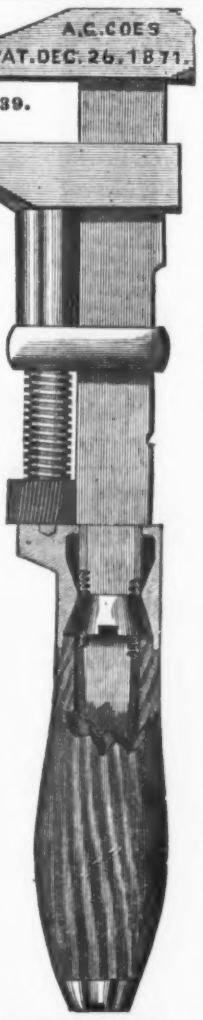
MATTHIAS SPENCER & SONS,
**Albion Steel Works, Sheffield,**
MANUFACTURERS OF

**FILES AND STEEL,**

Table Knives, Razors, Shovels, &c., &c. of every description.

CORPORATE MARK

SPENCER SHEFFIELD
**Granted 1749.**




**Established in 1839.**

**A. G. COES & CO.**
**WORCESTER,**
**MASS.**
Successors to
**L. & A. G. Coes,**
Manufacturers of
**THE GENUINE**
**COES**
**Screw Wrenches.**

**PATENTED,**
*May 9, 1871.*
*December 26, 1871.*
*December 25, 1875*
*August 1, 1876*

The backstrain when the wrench is used is borne by the bar—not by the handle.
The strongest Wrench made, and the only successful Re-enforced Bar.
None genuine unless stamped

**A. G. COES & CO.**

Our Agents, GRAHAM & HAINES, 113 Chamber St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

# Engström's Celebrated Razors.

THE BEST IN THE WORLD.

For Sale by all Principal Dealers in Cutlery.

EVERY RAZOR IS FULLY WARRANTED BY

## DAME, STODDARD & KENDALL,

SUCCESSORS TO

**BRADFORD & ANTHONY,**

**SOLE AGENTS FOR THE UNITED STATES,**
**374 WASHINGTON STREET, - - - - - BOSTON, MASS.**

**Patented Articles of**

## MALLEABLE IRON.

**NEW** pattern Heavy Screw Clamps strongest in the market.

Hammer's Malleable Iron Oilers, 3 size.
Hammer's Mall. Iron Hand Lamps.
Hammer's M. I. Hanging Lamps.
Hammer's Adjustable Clamos.

For sale by all the principal Hardware Dealers.
Send for Price List.

**MALLEABLE IRON CASTINGS**
Of superior quality, and Hardware Specialties in Malleable Iron made to order.

**HAMMER & CO.,**
**Branford, Conn.**

**AN IMPROVED**

## LEVELING INSTRUMENT.

PRICE OF INSTRUMENT COMPLETE, $20.

Adapted to the use of Architects, Engineers, Masons Builders, Farmers and others.

This instrument is made of Brass and Iron, furnished with both masons' (short metal) and surveyors' tripod, and put up in a handsome wooden box, with strap. The only low priced Level that can be thoroughly adjusted in the field.

**A NEW LEVELING ROD.**

This rod is round and made in two sections; is united by a solid screw joint, as if of one length, and has a target. There are two scales, one side being Engineers' (feet, 10ths and 100ths) the other Architects' scale (or, feet, inches and 8ths). Price, **$6.**

**WM. T. COMSTOCK,** Manufacturer,
**6 Astor Place, New York.**
Circulars and discount to hardware trade furnished to dealers sending their card.

TREE AND HEDGE TRIMMER.

Unsurpassed for cheapness and durability. Unlike any other make, it combines a perfect lever principle with a blade working in a slotted steel hook.

Send for illustrated circular and price list.

**E. S. LEE & CO.,**
**164 West Main Street,**
ROCHESTER, N. Y.

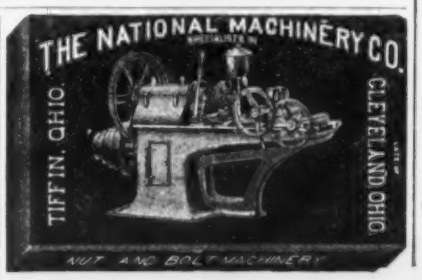
**GEO. H. CREED,**
**SHIP CHANDLERY,**
**103 Reade Street, New York.**
Manufacturers of and Wholesale Dealers in
**Cotton and "Long Flax" Sail Duck,**
**Cotton and Linen Ravens,**
Creed's Patent Ships' Crews. Heitman's Wire Rope Splicers. Agent for Raymond's American Crane Oil for lubricating Cylinders and Valves.

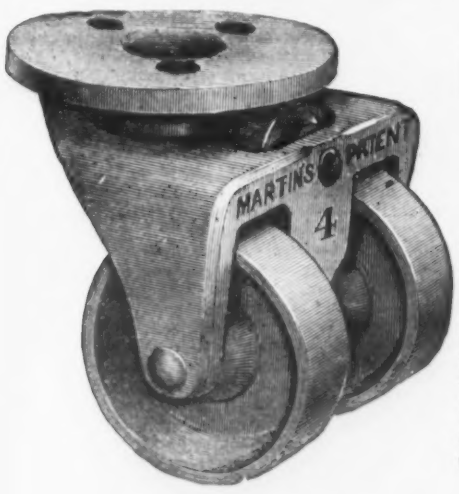
**ONEIDA ALARM TILL.**

SUSCEPTIBLE OF OVER **100** CHANGES.

Better than any other Till in the market. No tampering with keys, as it alarms every time a key is touched, unless acquainted with combination. Send for prices and compare this Till with others in the market. No Till-tapping possible.

MANUFACTURED BY
**THE ONEIDA ALARM TILL CO.,**
**EAST SYRACUSE, N. Y.**




OFFICE OF

## PHŒNIX CASTER CO.,

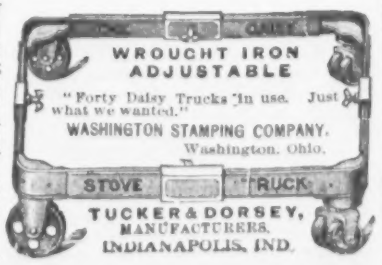
Indianapolis, Ind.

## MARTIN'S CASTER,

For heavy bedsteads, book-cases, flower stands, refrigerators, safes, sideboards, desks, or very heavy furniture. Also for heavy ice chests, magazine boxes, stove trucks, heavy showcases, beer boxes, or any very heavy weight. Especially adapted for use in beer bottling, fruit canning, tobacco or warehouse establishmen's, where heavily-loaded tables need to be moved.

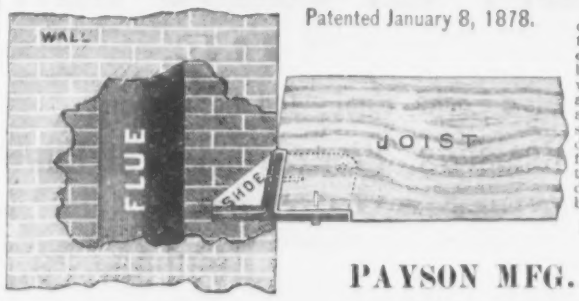
**Send for Catalogue.**

Our Drawer is so uniform, simple, strong and effective, that it has nearly driven all competition from the field.



## Iron Shoes for Flue Joists.

Patented January 8, 1878.




This is a new article of Builders' Hardware, and is applied to the ends of the joists that come opposite to chimney breasts or flues. It dispenses with trimmers and headers and brick arches, saves labor and material, secures greater strength, and obviates the chief danger of fire from defective flues. Where fireplaces occur, the joists are simply halved down and Shoes attached, then boxed to receive the hearth.

**Price of Shoes, Per Doz., $1.20.**

**PAYSON MFG. CO., Chicago.**

**THE WIRE GOODS CO.,**
**Worcester, Mass.,**
MANUFACTURERS OF
SHARP GIMLET POINTED
**WIRE GOODS.**
WIRE BENDING A SPECIALTY.
Wire Straightened and Cut to Length.

## RIFLE MANUFACTURERS.

Dealers' Firm Names put on when desired.

## GUNS AND PISTOLS.

WHOLESALE ONLY.

American and English Goods, Fishing Tackle, Winchester and Other American Rifles.

***Manufacturers of Leather Gun Cases, Holsters, Bags and Clothing of Leather and Duck.***

Dealers who visit us will always find **Job Lots.**

**166 Main St., CINCINNATI.**

**B. KITTREDGE & CO.**

**BARNES' SAWS.**

Complete Outfits for Workshop Business.
**Lathes for Wood or Metal, at**

**CHARLES E. LITTLE'S,**
(Eastern Agency. Factory Prices.)
**59 FULTON ST., NEW YORK.**
Descriptive Catalogue Free.

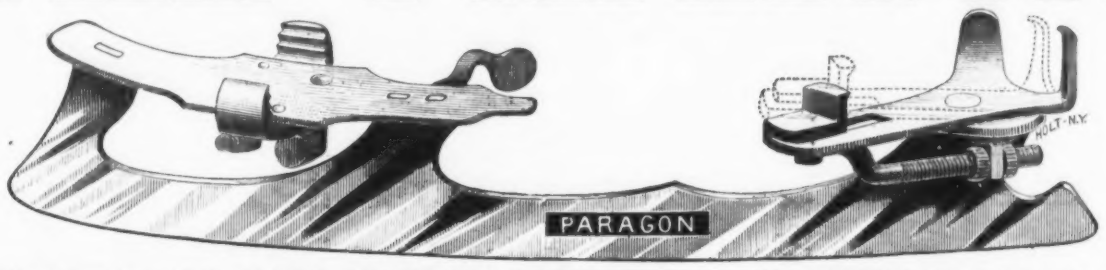
# HALL & ELTON'S GERMAN SILVER.

1837. 1882.

In addition to Spoons of this well-known brand, we are now prepared to furnish Forks of the same quality.
We GUARANTEE these goods to be SOLID and of UNIFORM quality throughout, with no coatings to wear through or flake off, and with no liability to RUST.

**HALL, ELTON & CO.,** Wallingford, Conn., and 47 East 13th St., New York.

# THE PARAGON.




*The Most Perfect ALL CLAMP LEVER SKATE Ever Made.* *NO TROUBLE IN ADJUSTING.*

NEAT, SIMPLE, POWERFUL AND EFFECTIVE.

In its general use at the leading Rinks and Skating Lakes last season, it invariably received the highest testimonials of favor. Yet, notwithstanding these, we have improved some points, so there cannot now be a question as to its great superiority.

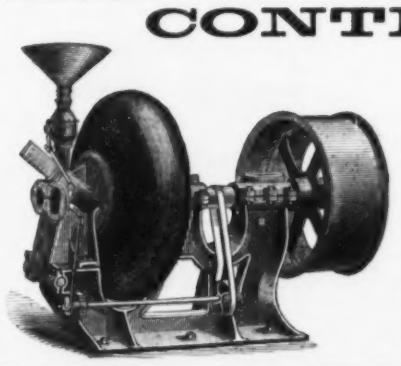
**WE ALSO MAKE A COMPLETE LINE OF ALL OTHER KINDS OF SKATES**

## WM. A. SUTTON,

MANUFACTURER,
522, 524, 526, 528 and 530 West 20th Street, - - - - - NEW YORK.

# CONTINENTAL WORKS

BROOKLYN, N. Y.



DUC'S Mechanical **ATOMIZER** Or Pulverizer,

For reducing to an impalpable powder all kinds of hard and brittle substances, such as QUARTZ, EMERY, CORUNDUM, GOLD AND SILVER ORES, BARYTES, COAL, OCHRE, MANGANESE IRON ORES,

**PHOSPHATE ROCK, &c.**

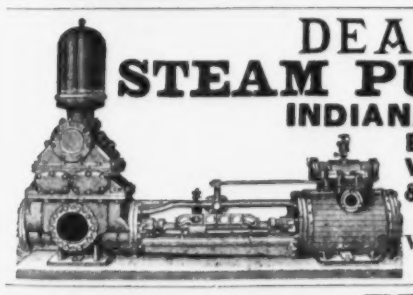
It is simple and not liable to get out of order, Revolving Shell being constructed of Siemens-Martin steel, and all parts mechanical in design and of first-class construction. Weight, 5,500 lbs., heaviest piece, 1,500 lbs. It will pulverize **7 to 10 TONS IN 10 HOURS** with 30 H. P.

For Circulars and full particulars, apply to or address

**THOS. F. ROWLAND, Sole Manuf'r, Brooklyn, N. Y.**

## DEAN BROS' STEAM PUMP WORKS,

INDIANAPOLIS, IND.



Boiler Feeders, Fire Pumps, Vertical Pumps, Air Pumps & Condensers, Water Works Pumps.

WRITE FOR CATALOGUE & PRICES.

## HOWARD IRON WORKS,

BUFFALO, N. Y.,

Manufacturers of

# BENCH VISES,

Price Lists sent on application.

# WESTON'S DIFFERENTIAL PULLEY BLOCKS.

DIRECT

CAPACITIES FROM 1-8 TON TO 10 TONS.

ONE MAN CAN LIFT 5000 POUNDS.

THEY HOLD THE LOAD SUSPENDED AT ANY POINT.

ALL SIZES IN STOCK.

SOLE MAKERS:

## YALE & TOWNE MFG. CO.,

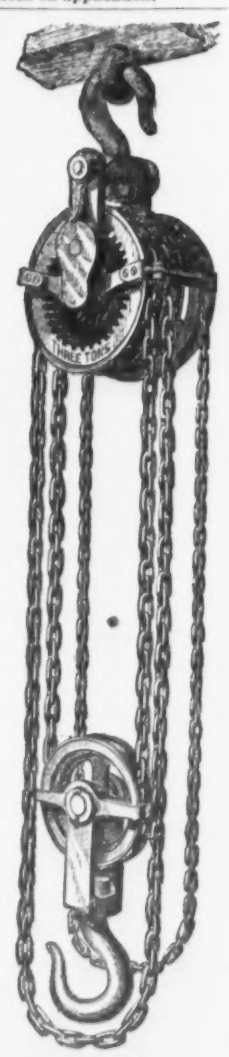
MANUFACTURERS, ENGINEERS AND MACHINISTS.

**Principal Office and Works, STAMFORD, CONN.**

SALESROOMS:

NEW YORK—62 Reade Street. | PHILA.—507 Market Street.
BOSTON—224 Franklin Street. | CHICAGO—64 Lake Street.

40-page Illustrated Catalogue of Light Hoisting Machinery sent on Application.




GEARED


process in the grand laboratory of nature. According to Cotta, there are two modifications of chemical composition in quartz, which are distinguished by their different degrees of solubility. "The one is insoluble in water and in every acid except hydrofluoric, and the other is soluble in water at high temperatures, especially in the presence of other acids and alkalies." The insoluble variety of quartz may, it is said, in process of time become "converted into the soluble by the contact influence of infiltrated moisture." It may, however, be noted that ordinary quartz, if fused with carbonate of soda, becomes soluble in water, and from this solution gelatinous silica is precipitated by hydric chloride. Years ago it was noted that silica when combined with an alkali is soluble in water, and that thus the decomposition of feldspar might in some instances be a source of silica in solution. The residue of decomposed feldspar, when it has been examined, has been found to contain only a portion of the silica due to it, the remainder having been dissolved. In a similar manner mica is another mineral which may be a source of supply for pure silica. A fact of some importance in studying the mode of the formation of quartz is that, unlike feldspar and other minerals, which in crystallizing pass at once from the fluid to the solid state, quartz passes through an intermediate viscous or colloid condition before it assumes the crystalline form. It is, comparatively speaking, only very recently that we have had any practical acquaintance with this colloidal form of silica. The late Mr. T. Graham, by his most valuable experiments in dialysis, succeeded in obtaining pure silica dissolved in water, which rapidly assumed a gelatinous condition.

The three principal agencies that have taken part in the formation of quartz are heat, water and organic life. When we examine, by the aid of the microscope, certain forms of quartz, such, for instance, as the crystals occurring in some of the quartz porphyries, and occasionally in the pitchstones, as well as much of the quartz of granite rocks, we find that they contain minute cavities which inclose very frequently tiny crystals of other minerals; in the quartz of granite these are very often found to be alkaline chlorides, or sometimes the cavities are filled up with glassy mineral matter—as, for instance, in the quartz of some of the Icelandic trachytes. Other cavities are found, especially in the granitic quartz, filled with gas, or sometimes with water, or liquid carbonic acid. In these latter cavities small bubbles will be found which are movable; the smaller ones, indeed, appear to be endowed with a kind of perpetual motion of their own. The quartz in these rocks must have crystallized at a very high temperature—indeed, where glass cavities occur, from a state of true igneous fusion. Mr. Sorby has shown that the solvent power of liquid water at the temperature of about 412° C. is very great; its action on glass has been such as to produce quartz crystals from it.

There seems to be clear proof that the quartz of the granite rocks which contains partially filled fluid cavities, and cavities inclosing crystals of common salt, &c., has been formed in a partially melted mass of rock, and began to crystallize when that mass was exposed to the solvent action of liquid water, at a temperature not far below 400° C., but yet not sufficiently high to expand the water into steam. Mr. Sorby concludes that "by far the larger part of the quartz in granitic rocks was set free and crystallized through the action of liquid water, at a temperature of a dull-red heat, just visible in the dark. The exact temperature may, however, have varied considerably, since, if the pressure were not sufficiently great, the water might remain in the form of steam until the rock had cooled somewhat more." It has been noticed as somewhat remarkable that the quartz in granite should have been usually the last mineral to crystallize, although it is that one which is the most difficult to fuse, and which would, therefore, naturally be expected to have been solidified before the feldspar and the mica. But it has been shown that, when quartz is in combination with other mineral substances, it is often as readily fusible as they are, and thus what must be called accidental circumstances may have led, in the case of the rocks in question, to its being crystallized after the feldspar, which we so generally find to have modified the form of the quartz, this latter appearing as a glassy paste inclosing the accompanying minerals, instead of having a definite form of its own. It has also been observed that the feldspar, in solidifying, would liberate a sufficient quantity of heat to enable the quartz to retain its viscous state; just as, on the other hand, in the quartz porphyries we see an instance of the analogous effect of the crystallizing quartz upon the feldspar. It is asked how the enormous masses of quartz which form some of the schistose rocks can have been produced? We must appeal to metamorphism. The contact of highly-heated eruptive matter might thus alter a quartz or sandstone into an almost pure quartz rock. Heat and pressure combined are mighty agents, which might also effect a similar change during the course of long ages. That water at a high temperature can hold quartz in solution is well illustrated by the deposits of silicious sinter, thrown down by thermal springs, as, for instance, the geysers of Iceland, and by others in Kamschatka and in New Zealand; this silica often incrusts mosses and other substances in the same way that we may see calc-tuff forming petrifactions in other localities. The delicate, feathery crystallizations of silicious sinter are extremely beautiful. The quartz of veins appears generally to have been deposited from aqueous solution, and will be seen, as has been already remarked, to contain innumerable cavities inclosing water. Occasionally these watery cavities are of large size, and may be observed without any instrumental aid.

Among the most varied and beautiful forms of quartz which have had a purely aqueous origin are all the varieties of crystalline and amorphous silica, which frequently coat the interior of geodes and other hollow spaces in the igneous rocks, and which consist chiefly of an intermingling of chalcedony and jasper, and are conveniently grouped under the general name of agates. Pure rock crystal, amethyst, cairngorm and other valuable crystallized forms of quartz, are often found in connection with the same rocks, or in others of a more purely metamorphic character. All these varieties of quartz are secondary formations, deposited from watery solutions. The exact mode in which agates have originated is a question full of interest, and not easy in every case to answer. A wonderful history of mineral growth is written in the folded leaves, if one may so denote the bands of a single agate. A very large number of agates consist of more or less concentric layers of chalcedony of various colors (the colors depending on the presence of metallic oxides), together with jasper, rock crystal, amethyst, &c., in many cases. Chalcedony is sometimes described as a reniform condition of silica, and though apparently amorphous, when it is microscopically examined it generally, if not always, exhibits a minute and definite radiated crystalline structure. It frequently forms stalactites, and many of the most exquisite of the banded agates are sections cut from stalactitic formations. Jasper may be looked upon as chalcedony, which, as it consolidated, caught up a certain amount of alumina, or sometimes of lime or oxide of iron. Professor Ruskin, who has paid some attention to this subject, has observed that "jasper will collect itself pisolically out of an amorphous mass into a concretion round central points, but does not actively terminate its external surface by spherical curves, while calcedony will energetically so terminate itself externally, but will, in ordinary cases, only develop its pisolitic structure subordinately, by forming parallel bands round any rough surface it has to cover, without collecting into spheres, unless provoked to do so by the introduction of a foreign substance, or encouraged to do so by accidentally favorable conditions of repose." According to the same observer, some agates appear to be of the nature of concretions formed from within, round a neucleus; these would consist of chalcedony or jasper in the inner portions, and have distinctly crystallized exteriors. There is another class of agates composed of external bands of chalcedony or jasper, stalactitically deposited in a cavity which may either have a hollow center or one filled up with crystals and quartz. There appear, however, to be intermediate varieties in which concretionary or stalactitic formations have been combined with, or interrupted by, other modes of growth. Some of the most curious and beautiful agates are those containing dendritic crystallizations; in these we see, in the more or less transparent chalcedony, which in these agates is not banded, wonderful mossy or confervoid-like growths, often very closely resembling vegetable forms. The valuable stones from Mocha contain ferruginous brown or black inclosures, while some of the dendritic agates from India are filled with a bright-green network of what appear to be filaments of confervæ. These dendritic forms in the moss-agates are mostly the oxides of iron or manganese; or, in the green Indian pebbles, delessite or chlorite. The question of their origin is a difficult one. In some agates the dendrities may have resulted from a segregation of the oxides of the metals from the colloid or partially crystallized silica; in other cases they may be the effect of subsequent infiltrations; or, again, the quartz may have been consolidated around previously existing crystallizations. With regard to infiltration by these oxides, it is well known that even the most compact-looking chalcedony is permeable, as it is possible by steeping it in solutions of the aniline or other dyes to impart the most brilliant tints to agates, the dye undoubtedly gaining access to the interior of the specimen through the interspaces of its minutely crystalline structure.

In a large group of agates, of which beautiful specimens come from India, an appearance of banded formation is seen, which, upon microscopic examination, resolves itself into an infinite number of red or brown spots, regularly arranged in bands or concentric groups; these spots appear to be segregations of oxide of iron. I have not seen a specimen of this species of agate cut sufficiently thin to show whether the arrangement of these minute spots is dependent upon a banded structure in the chalcedony itself, or whether it is independent and the result of molecular force which has determined the arrangement in question. It may here be noticed that a vast number of the Indian agates come from the neighborhood of the Gulf of Cambay. Near Turkeysar there are agate conglomerates intercalated between beds of laterite which belong to the Eocene period. These conglomerates we may suppose to have been derived from the denudation of the earlier igneous rocks which abound in the same district. Uruguay, in South America, also produces a large number of remarkably fine banded agates. Sometimes well-formed quartz crystals will be found inclosing other substances, which in some instances have been caught up by the crystals in the course of their formation, or have crystallized, perhaps, almost simultaneously with the quartz. In other cases the quartz is proved to have crystallized over other previously-formed crystals; thus schorl is occasionally seen partially inclosed in quartz crystals and partially free, the ends of the crystals of schorl projecting through the quartz. Titanite asbestos and other minerals are not unfrequently found in minute acicular forms in quartz. The quartz in the igneous rocks may frequently be seen to inclose crystals of feldspar or titanite, or portions of the matrix which must have been previously solidified. Opal, as has already been pointed out, is a product of aqueous origin found in the fissures and amygdaloid cavities of igneous rocks. Its wondrous play of colors has given rise to much discussion by Brewster, Des Cloiseaux and other writers. Some have attributed it to the presence of numerous cavities of varying size, which cause a kind of iridescent refraction. Des Cloiseaux was inclined to suppose that organic matter might be inclosed in small quantities in its cavities. The most reasonable supposition, however, appears to me to be that of Reusch—that light reflected or transmitted from number-

# H. D. SMITH & CO.,

## Plantsville, Conn.,

**Manufacturers of the**

# BEST QUALITY CARRIAGE MAKERS' HARDWARE,

Manufacture the Largest Variety of Forge Carriage Irons, of Best Material and Workmanship.

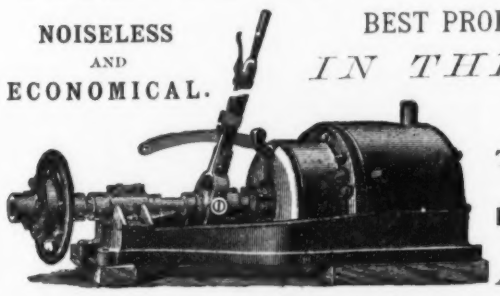
**PRICES LOW FOR QUALITY OF WORK FURNISHED.**

**SEND FOR PRICE LIST.**

---

## THE COLT DISC ENGINE.

NOISELESS AND ECONOMICAL.



BEST PROPELLER ENGINE *IN THE WORLD* FOR YACHTS, TUGS and LAUNCHES.

ALSO INVALUABLE FOR

Dynamo Electric Machines, *High Speed Machinery,* And Elevator Uses.

WRITE FOR CATALOGUE TO

**COLT'S PAT. FIRE ARMS CO., Har ford, Conn,**

Or to LEONARD & McCOY, 118 Liberty St., New York.

---

## CHICAGO FORGING CO.,

No. 14 Metropolitan Block,

CHICAGO, ILL.

**DROP FORGINGS** IRON AND STEEL OF EVERY DESCRIPTION

*For Fire Arms, Saw and Wind Mills, Engine, Tool and Machine parts of all kinds. Railroad and Marine Work. Agricultural Implements and Machinery, Carriage and Wagon Irons, Electrical and other Apparatus.*

ANSON STAGER, President,
W. H. SWIFT, Vice-President,
E. L. BROWN, Treas. & Gen. Man.
F. J. CUSHING, Secretary.

Orders for Forgings in Iron or Steel required to be duplicated in large numbers, or which may be too small, intricate or expensive to be made by hand on the anvil, are especially solicited. Estimates furnished upon receipt of sample or patterns of forgings required.

---

## Eureka Patent Shear

For Cutting Round and Flat Bar Iron and Sheet Metal.

**MADE ENTIRELY OF CAST STEEL.**

Cheapest and best tool for the purpose ever put on the market.

**Send for Descriptive Circular.**

**EUREKA SHEAR CO.,**

**811 Market St., Philadelphia, Pa.**

---

Note New Improvements. Round Knurled Nut and Rocker Washer.

SPRING CALIPER.

## J. STEVENS & CO.,

Chicopee Falls, Mass., P. O. Box 224,

Manufacturers of

## Spring Calipers and Dividers.

Also, Surface Gauges and Counter Sinks, Stevens' Patent Breech-Loading Sporting Rifles, double and single barrel; Shot Guns, Pocket Rifles, Pocket Pistols, and the noted Hunters' Pet Rifles. Our

**SHOOTING GALLERY RIFLE**

is the favorite everywhere.

SEND FOR ILLUSTRATED CATALOGUE AND DISCOUNTS.

---

**PATENT AUTOMATIC STOP**

## ELEVATORS AND DUMB WAITERS,

HYDRAULIC OR STEAM POWER.

**SPEED, 50 TO 500 FEET PER MINUTE, WITH PERFECT SAFETY.**

The fastest Belt Machine in the Market running noiselessly. Can be **stopped at any floor with certainty without an attendant.** Especially adapted to **high speed** Freight and Package business. Address

**TEWKSBURY AUTOMATIC ELEVATOR CO.,**

OFFICE AND FACTORY,

**275, 277 & 279 Passaic St., NEWARK, N. J.**

---

## PEACH & APPLE PARERS.

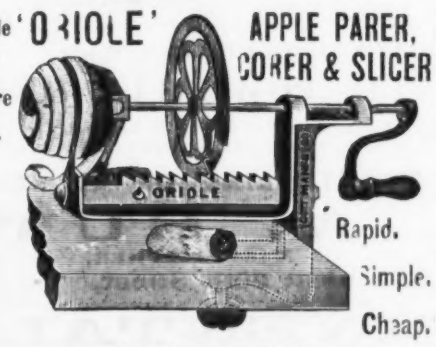
Scott's "Rotary Knife" PEACH AND APPLE PARER.

For Sale by all Hardware Dealers.

The Only Successful Peach Parer.
The Best Apple Parer.
**Scott Manufac'ng Co.**
Sole Patentees and Manfrs.
BALTIMORE, MD.

Sample by Express upon receipt of $2.00

'ORIOLE' APPLE PARER, CORER & SLICER




Rapid. Simple. Cheap.

ALSO MANUFACTURERS OF

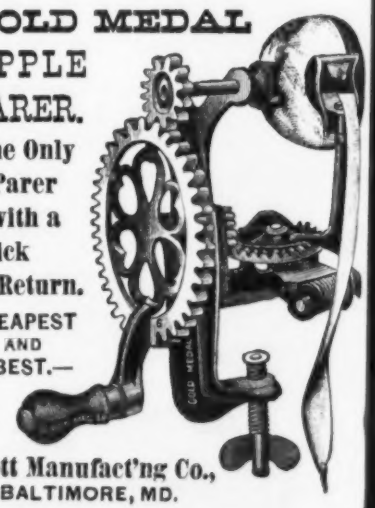
"UNIVERSAL" AND "NEW IDEA" CAN OPENERS,

**Medallion and Victoria Egg Beaters.**

COLD MEDAL APPLE PARER.

The Only Parer with a Quick Return.

CHEAPEST AND —BEST.—




**Scott Manufact'ng Co.,**
BALTIMORE, MD.

**SCOTT MANUFACTURING CO.,**

**BALTIMORE, MD.**

---

## NEW HAVEN HORSE NAIL CO

WE GUARANTEE ALL NAILS SUPERIOR IN QUALITY.

TRADE MARK

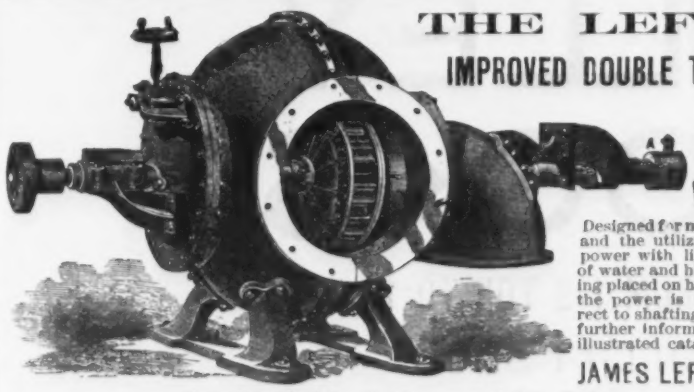
PERFECT IN DRIVING UNEXCELLED IN FINISH.

**FORGED POINTED FINISHED**

FOR SALE BY

**ELY & WILLIAMS, 178½ Water Street, New York.**
**RUNYON & HALLETT, 103 Chambers St., New York.**

---



## THE LEFFEL IMPROVED DOUBLE TURBINE MINING WATER-WHEEL,

Designed for mining purposes and the utilization of water power with limited quantity of water and high heads. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts. For further information and free illustrated catalogue, address

JAMES LEFFEL & CO

**Springfield, Ohio, or 110 Liberty St., N. Y.**

---

## CARY'S PATENT WARDROBE HOOKS,

DRAWER AND WINDOW KNOBS, SCREW KNOBS, TOWEL RACKS, &c.

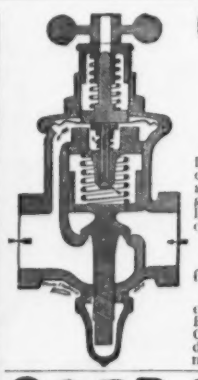
**FOR SALE BY**

**Leading Jobbers throughout the United States at Manufacturers' Prices.**

Send for Price List.

MANUFACTURED ONLY BY **VANDERBILT BROS.,** 2 Lispenard Street, Cor. W. Broadway, N. Y.

---



## CURTIS PRESSURE REGULATOR,

FOR STEAM and WATER,

Is made entirely of metal occupies the same space as a globe valve. It has no glands or packing, and is a lock-up valve. Write for circular. Manufactured by

Curtis Regulator Co,

61 Beverly St., Boston, Mass.

General Agencies: 109 Liberty St., N. Y.; 908 Market st., Phila., Pa.; 80 Market St., Chicago Ill., and cor. Halliday and Saratoga Sts., Baltimore, Md.

---

## COBB & DREW

**Plymouth, Mass.,**

Manufacturers of Copper, Brass and Iron Rivets; Common and Swedes Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk, Clout and Cigar Box Nails, &c. Rivets made to order.

NEW YORK AGENCY,

**GRUNDY & DISOSWAY,**

**HARDWARE.**

**165 GREENWICH STREET,**

Agents for the Philadelphia Star Carriage and Tire Bolts.

---

ROMER & CO. Manufacturers of Patent Jail Padlocks, Brass and Iron Padlocks, Carriage Lamps and Lanterns, 28 to 42 Summer Avenue, Newark, N. J. Illustrated catalogues sent to the trade on application.

---

HOW TO KEEP **BOILERS** CLEAN

FREE Book Sent To Any Address By JAS. F. HOTCHKISS, 84 JOHN ST. N.Y.

---

## MINERS' CANDLES.

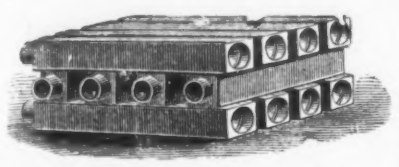
**Superior to any other Light for Mining Purposes.** Manufactured by

**JAMES BOYD'S SON,**

**Nos. 10 & 12 Franklin St., New York.**

FRANKLIN S. MILES,
Manufacturer of
Brass, Iron, Steel and German Silver
SCREWS,
205 Quarry Street, Philadelphia.

A. WYCKOFF,
Manufacturer of



CHAIN PUMP TUBE

Special prices to the wholesale trade for the next 30 days.

122 Railroad Avenue, ELMIRA, N. Y.

R. COOK & SONS,
Manufacturers of
Carriage & Wagon AXLES,
WINSTED, CONN.
ESTABLISHED - - - - - 1839.

N. Y. MALLET and HANDLE WORKS

Manufacturers of
Sailors', Carpenters', Stone Cutters', Tin, Copper and Boiler Makers'
MALLETS,
Hawsing Beetles, Hawsing and Calking Irons; also all kinds of Handles, Sledge, Chisel and Hammer Handles, Also
COTTON AND BALE HOOKS.
Patented Feb. 13, 1877; a new combination of Hooks.
456 E. Houston St. New York City.

158 CHAMBERS ST. NEW YORK CITY
F. R. Emmons & Bro.
TACKS
E. PHILLIPS & SONS, Manufacturers, SO. HANOVER, MASS.

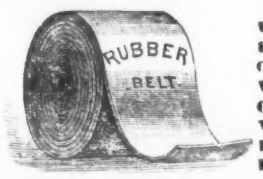
WHIPPLE MFG. CO.,
CLEVELAND, O.
Builders' Hardware,
DOOR LOCKS & KNOBS
AND
Fine Bronze Trimmings.

WALDRON & SPROUT,
Manufacturers of
Sprout's Double and Single Shear
Horse Hay Forks
And
Sprout's
HAY ELEVATORS, PULLEYS and GRAPPLES.
Send for Circulars.
Muncy, Lycoming Co., Pa.

KEYSTONE SCREW CO.,
17th and Venango Sts., Philadelphia.
J. BILLERBECK,
Manufacturer of
IRON
Gimlet-Pointed Wood Screws.
WRITE FOR DISCOUNTS

Vulcanized Rubber Fabrics
ADAPTED TO
MECHANICAL PURPOSES
RUBBER BELTING and PACKING.

Machine Belting.
Steam Packing.
Leading Hose.
Suction Hose.
Grain Elevators.
Steam Hose,
Piston Rod Packing.
Gaskets and Rings,




Vacuum Pump Valves,
Ball Valves,
Car Springs,
Wagon Springs,
Gas Tubing,
Machine Belting.
Billiard Cushions.
Emery Wheels.

This company manufactured the immense DRIVING and ELEVATOR BELTS for the Buckingham Elevators at Chicago, which have been running perfectly for more than Twelve Years, also those for Armor, Dole & Co., of Chicago. Vanderbilt's Elevators for the N. Y. Central & Hudson River R. R., the great Elevators of the Penna. and Erie Railroads, of Jersey City and Hoboken, Dow's Stores, of Brooklyn and many others; in fact, the largest Belts for the largest Elevators in the world.
A single carrier belt in the Penna. R. R. Elevator is over 2000 feet long, weighing 18,000 pounds, and has run perfectly from the start.

LINEN and COTTON HOSE.
Plain and Rubber Lined.

Pat. 6545.

"TEST" HOSE.

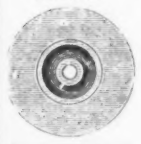
Circular Woven-Seamless Antiseptic RUBBER LINED "CABLE" HOSE and "TEST" HOSE, Vulcanized Para Rubber and Carbolized Duck, for the use of Steam and Hand Fire Engines, Force Pumps, Mills, Factories, Steamers, Ships, Hospitals, &c

Pat. July, 1873.

"CABLE" ANTISEPTIC.

Emery Wheels and Packing.
ORIGINAL
Solid Vulcanite
EMERY WHEELS

Patented



Emery Wheel.

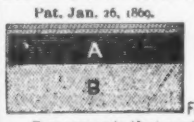
LARGE WHEELS MADE ON CAST-IRON CENTER IF DESIRED.

Patented

Section of Emery Wheel showing Iron Center.

The properties of these Wheels are such that they can be used with great advantage and economy for cutting, grinding and finishing Wrought and Cast Iron, Chilled Iron, Hardened Steel, Slate, Marble, Glass, etc. These wheels are extensively used by manufacturers of Hardware, Cutlery, Edge Tools, Plows, Safes, Stoves, Fire Arms, Wagon Springs, Axles, Skates, Agricultural Implements, and small Machinery of almost every description.

Pat. Jan. 26, 1869.




PATENT ELASTIC
Rubber Back Square Packing,
BEST IN THE WORLD.
For Packing the Piston Rods & Valve Stems of Steam Engines & Pumps.

Pat. Jan. 26, 1869.

B represents that part of the packing which, when in use, is in contact with the piston rod.
A the elastic back, which keeps the part B against the rod with sufficient pressure to be steam tight, and yet creates but little friction.
This Packing is made in lengths of about 20 feet, and of all sizes from ¼ to 2 inches square.

Corrugated Rubber Mats and Matting,

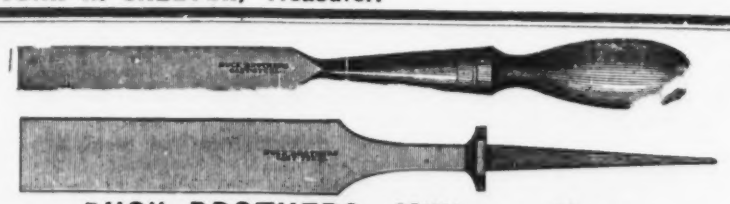
Pat. 11,208, 213,601

For Halls, Flooring, Stone and Iron Stairways, &c.

Pat. July, 1879.

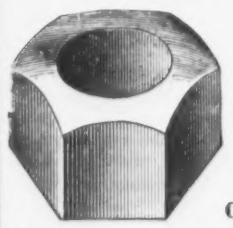
This practical and indispensable article—especially for wear where exposed to ice, snow or slush—was first introduced by this company several years ago, and its real value is **in being almost indestructible, when proper materials are used in its manufacture,** whilst the cheap, inferior quality forced on the public by reckless imitators of our patent goods soon becomes brittle and crumbles to pieces. Address

NEW YORK BELTING & PACKING CO.,
*Warehouse, 13 & 15 Park Row (Opposite Astor House), New York*
JOHN H. CHEEVER, Treasurer.

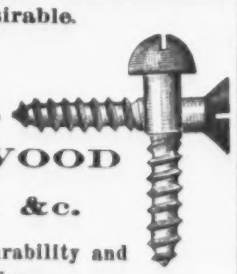


BUCK BROTHERS, Millbury, Mass.
The most complete assortment in the U. S. of
Shank, Socket Firmer and Socket Framing Chisels.
PLANE IRONS.
CAUTION.—Buyers should be on their guard and not have inferior goods palmed on them by unprincipled persons, who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have on our trade-mark also "Riverlin Works."

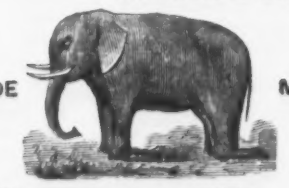
PHOSPHOR-BRONZE
FOR
BEARINGS, SLIDE VALVES, CYLINDER RINGS, CROSS-HEAD GIBBS, STEPS, BUSHINGS,
And all purposes where Maximum Durability, Anti-Frictional and Non-Cutting Qualities are Desirable.



PUMP RODS,
BOLTS & NUTS,
MACHINE and WOOD
SCREWS, &c., &c.



Combine Toughness, Strength, Durability and Resistance to Corrosion,

TRADE  MARKS.

"Phosphor-Bronze."

CASTINGS OF ALL KINDS TO ORDER.
SEND FOR PAMPHLET AND PRICES.
THE PHOSPHOR-BRONZE SMELTING CO., LIMITED,
No. 512 Arch St., PHILADELPHIA, PA.
Owners of the U. S. Phosphor-Bronze Patents. Sole Manufacturers of Phosphor Bronze in the United States.


less flaws in the mineral gives rise to the phenomena in question through a process of double refraction.

We may now turn to the consideration of forms of quartz which have a more or less organic origin. At the head of these may be placed such undoubtedly organic aggregations of silica as the Tripoli and semi-opal of Bohemia, which consist almost entirely of fossil diatomaceæ. Some beds of rock also in the Island of Barbadoes are found to be composed of little else than polycystinæ and spiculæ of sponges. Much of the flint so characteristic of the chalk rocks, as well as the chert of the greensand and of the mountain limestone, appears to have been derived from the precipitation, by organic substances, or silica held in solution by the waters of the ocean; at any rate, much of it seems to have been thus deposited; flinty nodules are often found to consist of fossilized sponges, the silicious skeletons of which may have attracted to themselves the silica dissolved in the surrounding water. Spiculæ of sponges, diatomaceæ, foraminifera, shells, corals and other organisms are abundant in the flint, and also in much of the chert. Recent observations by MM. Guignet and Teller have shown that the water of the Bay of Rio de Janeiro contains large quantities of both silica and alumina in solution, the amount in the case of silica being as much as 9.5 grains per cubic meter. Wood will sometimes be found to be pseudomorphosed into silica, the woody structure being replaced atom by atom, so that the minutest vessels are perfectly preserved. Various species of palm from the East Indies are frequently found fossilized in this manner, and sections of them make very beautiful objects for the microscope. Large fragments of a partially silicified wood may often be found in the neighborhood of Hastings, derived from the wealden formation. The curious so-called mineral beekite is really coral or shelly matter which has been replaced by silica. Researches into the behavior of the colloid form of silica, already spoken of, have shown how in many instances large deposits of silica, such as the flinty bands of the cretaceous formation, may have originated. Mr. Church's experiments, made some years since, proved that the minutest particle of carbonate of lime was sufficient to transform the pure aqueous solution of silica into the solid state in the course of a few minutes, and he was able, by the infiltration of silica in solution, to replace almost entirely the carbonate of lime in recent coral by silica, producing by this means what may be looked upon as a kind of artificial beekite. Thus in the slower, perhaps, but mighty, chemistry of nature marvelous reactions may have taken place, giving rise to some of the multitudinous forms in which silica presents itself to the mineralogical student.

## "Subject to Delay."

Thomas Marvin, a manufacturer of straw hats in this city, recently brought a suit against the Western Union Telegraph Company for refusing to send two messages, which he presented at the general office, without the condition that the dispatches were accepted subject to delay. On July 26, the day when the plaintiff attempted to send the messages, the telegraph company imposed this condition on account of the strike of its operators. Justice Angel, of the First District Court, recently rendered a decision, giving judgment for the plaintiff of $100 and costs, the full penalty prescribed by statute. In the course of his opinion, Justice Angel said:

"The power which the defendant company sought to exercise, of mailing messages en route if necessary, by the terms of its notice publicly posted in its principal office, was in effect an abandonment of the uses of the franchise and a refusal to perform its corporate functions. With equal propriety a corporation railroad having a line of communication by rail between Buffalo and New York (being engaged in a dispute with its employees) might reserve to itself the alternative of transferring its passengers and freight by the ancient system of stage coaches and freight wagons, or the slow process of the canals, and yet claim a performance of its corporate functions. The very object and purpose of the statute in granting the franchise to this corporation defendant was to provide the public with the facilities of a rapid transmission of messages by the agency of electricity, and to accomplish this rapidity of communication the corporation is bound to use every means within its power. It cannot shield itself from this imperative duty under any pretext of delay except such as the law would recognize as unavoidable. The exercise of their unrestricted control and absolute condition in the receipt and transmission of messages does not fall within the rule of regulating the conduct of its business, but is an assumption on the part of the corporation of a right to divert the uses of its franchise to the extremity of summarily disposing of the privileges to which the public is entitled, in its own way, and in a manner which must necessarily prove destructive to the public benefit sought to be conferred by the statute itself."

**Telegraph Statistics.** — The Western Union Company has now over 130,000 miles of telegraph lines, and over 375,000 miles of wire. In other words, its wire is long enough to go 15 times around the world and to tie a good knot in the end of it. It has more than 12,000 offices, and it sent last year over 38,000,000 messages. Its receipts in 1882 were $17,114,166, and its profits more than $7,000,000. Ten years ago it had only in round numbers 65,000 miles of line, and its profits were less than $2,700,000. Then it made 15 cents profit on every message it sent, now it makes 18. The capital stock of the Western Union is $80,000,000 and it has exclusive contracts with the international cable companies, operating eight Atlantic cables. In comparison with it the other companies are nothing. The Mutual Union Company has only $10,000,000 stock, and only 8000 miles of line. The American Rapid has $4,000,000 stock and 800 miles of line; the Baltimore and Ohio 2800 miles of line; the Postal Telegraph Company 4000 miles, and the Bankers' and Merchants' Telegraph has only 280 miles of line, and its stock is only $1,000,000.

## The Metal Exchange.

The New York Metal Exchange has recently made some changes in its regulations, which we publish for the benefit of our readers. The Pig-Iron Committee have adopted the following classification of brands of pig iron to be delivered on a standard contract, superseding the classification of July 6, which is now in force, abandoning the "special" grade, and fixing September 22 as the date on which the new classification shall go into effect: Allentown, Andover, Bushong, Carbon, Chickies, Clove, Chestnut Hill, Colebrook, Coleraine, Conestoga, Copelay, Crane, Durham, Emaus, Glendon, Hudson, Leesport, Lehigh, Macungie, Manhattan, Monocacy, Moselem, Musconectong, Olcott, Oxford, Port Oram, Poughkeepsie, Reading, Saucon, Sheridan, South Easton, Thomas, William Penn.

On the 24th inst. the following additional rules were adopted to govern transactions in pig iron:

RULE 7. On all sales of American pig iron for future delivery, five days' notice of delivery, exclusive of Sundays and legal holidays, shall be given by a transferable notice in the following form:

TRANSFERABLE NOTICE.

.....o'clock. NEW YORK,.....188

M .....

Take notice that on.....shall deliver you 100 tons.....No. 1 pig iron, g.m.b., in accordance with the terms of.... contract sale to you dated.....at .....dollars per ton of 2240 lbs....pledge .....to deliver warehouse order to the last holder of this notice upon presentation to....between the hours of.....of the.....being the day previous to that of delivery. The iron is to be received and held by the last acceptor hereof as custodian for....., and subject to..... order until.....paid at the rate of..... dollars per ton of 2240 lbs.

.....

Which must be indorsed by the first receiver in the form following.

NEW YORK,.....188

In consideration of one (1) dollar, paid to each of the acceptors, receipt of which is hereby acknowledged, it is agreed that the last acceptor hereof will, between the hours of.....on the day preceding the .....present the within notice to....., receive the warehouse order for the pig iron therein named, and on the following day receive the iron and hold the same as custodian and agent for the said.....and subject to their order, until they are paid the full amount of.....dollars per ton of 2240 pounds. It is further agreed that each acceptor hereon shall continue his or their liabilities to each other for the fulfillment of the contract until this notice shall have been returned to..... and a warehouse order specifying the iron to be delivered received by the last acceptor hereof from....., at which time all responsibilities of intermediate parties shall cease.

.....

Which may be transferred until 2 p. m. of the day of issue in the form following:

....o'clock. NEW YORK,.....188

M.....

We accept the above, with all its conditions and obligations, and you will please take notice that in accordance therewith we shall deliver you 100 tons No. 1 pig iron, g.m.b., on account of our contract sold to you, dated..... The iron to be paid for at the price of transferable notice.

.....

Said notice must be issued to the first receiver before 11 a. m. of the day of issue, and each transfer must be made promptly, each transferee indorsing upon it the time he receives it. All transfers shall be made between 11 a. m. and 2 p. m. Should the office of the party to whom notice is to be given be closed, it shall be good service to give the same to the secretary of the Exchange, who shall thereupon indorse upon it the day and time of its receipt, and post notice thereof on the bulletin of the Exchange. The price at which transferable notices are to be issued shall be the settling price for that month, as announced by the secretary each day at the close of the call, and all differences shall be paid as provided in Rule 5 of General Rules on Iron and Steel, for payment of ring settlements.

RULE 8. When no notice is given, the delivery shall be made on the last day stipulated in the contract, and the party so delivering shall present to the first receiver a transferable notice before 11 a. m. of the business day next before that of delivery. All transfers must be made as provided in Rule 7, and the party with whom it may lodge at 2 p. m. on the day of issue must present it to the drawer thereof before 5 p. m. on the day of delivery, and receive a warehouse order for the pig iron.

RULE 9. In case the office of any member shall be more than half a mile distant from the Exchange, and he shall not have designated an office within half a mile of the Exchange where transferable notices may be served, it shall be a good service to present the same to the secretary of the Exchange, who shall post it on the bulletin in the same manner as provided in Rule 7, in the case of the office of the party being closed.

Messrs. Daniel K. Bayne, of Simmonds & Bayne; William Pinkney, of Benner & Pinkney, and C. L. F. Rose, of Toel, Rose & Co., were elected members on the 24th inst.

Several amendments to the by-laws have been pending for some time, and were probably acted upon yesterday. They will be published in our next issue.

Government chemical laboratories exist in France for testing the qualities of food, wine and all articles of consumption and use that are subject to fraud and adulteration. The officials of these Government laboratories are constantly employed in detecting adulterations. Deleterious adulterations of food and wine are destroyed. Other adulterations that merely affect the quality of the articles offered for sale and are not hurtful, except as frauds upon purchasers, are confiscated and sent to the hospitals. The laboratories belong to the police force of the Government, and are designed to facilitate the detection and punishment of knaves.

# The Iron Age

AND

## Metallurgical Review.

New York, Thursday, August 30, 1883.

DAVID WILLIAMS, - *Publisher and Proprietor.*
JAMES C. BAYLES, - *Editor.*
JOHN S. KING, - *Business Manager.*

**RATES OF SUBSCRIPTION,**
INCLUDING POSTAGE.

THE UNITED STATES, BRITISH AMERICA AND SANDWICH ISLANDS.

**Weekly Edition**.....**$4.50 a year.**
Issued every THURSDAY morning.
**Semi-Monthly Edition**.....**$2.30 a year.**
Issued the FIRST and THIRD THURSDAY of every month.
**Monthly Edition**.....**$1.15 a year.**
Issued the FIRST THURSDAY of every month.

**TO ALL OTHER COUNTRIES,**
PER ANNUM, POSTPAID.

**Weekly Edition:** $5.00—£1—25 francs—20 marks—12 florins—6 roubles (coin)—25 lire—20 pesetos.
**Semi-Monthly Edition:** $2.50—10/—12½ francs—10 marks—6 florins—3 roubles (coin)—12½ lire—10 pesetos
**Monthly Edition:** $1.25—5/—6¼ francs—5 marks—florins—1⅛ roubles (coin)—6¼ lire—5 pesetos.

REMITTANCES
should be made by draft, payable to the order of David Williams, on any banking house in the United States or Europe; or, when a draft cannot be obtained, in postage stamps of any country.

NEWSDEALERS OR BOOKSELLERS
in any part of the world may obtain *The Iron Age* through the American News Company, New York, U. S. A.; the International News Company, New York, U. S. A., and London, England; or the San Francisco News Company, San Francisco, Cal., U. S. A.

**RATES OF ADVERTISING.**
One square (12 lines, one inch), one insertion, $2.50; one month, $7.50; three months, $15.00; six months, $25.00; one year, $40.00; payable in advance.

**BRITISH AGENCY.**
Office of THE IRONMONGER, 44a Cannon st., London.

**DAVID WILLIAMS, Publisher,**
**83 Reade Street, New York.**

PITTSBURGH.....77 Fourth Avenue.
Jos. D. WEEKS, Manager and Associate Editor.
PHILADELPHIA.....220 South Fourth Street.
THOS. HOBSON, Manager.
CHICAGO.....36 & 38 Clark st., cor. Lake.
HENRY SMITH, Manager.
CINCINNATI.....55 West Fourth Street.
CHATTANOOGA.....Eighth and Market Streets.
S. B. LOWE, Manager.

SOLE AMERICAN AGENCY FOR
**THE IRONMONGER,**
Published at 44a Cannon St., London.
The oldest and leading representative of the British Iron and Hardware Trades.
**Subscription, Postpaid**.....**$5.00**
to countries outside of Great Britain, including Monthly Foreign Supplement of one copy of Ironmonger's Diary.
By a mutual clubbing arrangement between the two journals, subscriptions to both will be received by either *The Ironmonger* or *The Iron Age* on the following terms:

THE IRONMONGER and THE IRON AGE, Weekly.
In the United States and Canada.....$7.50 or £1. 10s
In Great Britain and Ireland.....5.50 or 1. 2s
In other countries.....8.00 or 1. 12s
THE IRONMONGER, Weekly, and THE IRON AGE, Monthly.
In the United States and Canada.....$5.75 or 23s
In Great Britain and Ireland.....3.25 or 13s
In other countries.....5.75 or 23s


## INDEX TO VOL. XXXI.

The index for the half-yearly volume of *The Iron Age*—January to July, 1883—is now ready. A copy will be sent to each subscriber who sends a request for the same. Those who desire the index should apply at once.

## The Foreign Commerce of the United States.

According to a statement recently issued by the United States Bureau of Statistics, the volume of our foreign trade has been very nearly the same for each of the past four fiscal years, although the combined imports and exports in the fiscal year which ended June 30, 1883, were a little the largest on record. The total imports and exports for each of the past four fiscal years were as follows:

| Years. | Volume of trade. |
|---|---|
| 1880 | $1,503,593,402 |
| 1881 | 1,545,041,974 |
| 1882 | 1,475,181,794 |
| 1883 | 1,546,928,479 |

These figures show a wonderful growth in our commerce when compared with the figures for 1860 and 1870, which were $687,192,176 and $828,730,176, respectively. Even in 1873, when our trade had swollen to proportions never before reached, and not even equaled in several subsequent years, the volume of trade was almost one-fourth less than that of 1883, amounting to only $1,164,616,132. It is a difficult task to assign limits to the trade of this country, for its growth in every way has been phenomenal, and if business could be permitted to go on without disturbing influences being periodically obtruded, there is no doubt that there would be a natural increase shown in it from year to year. It is the general opinion that last year's trade would have been larger than it was if the tariff question had not been in a state of incessant agitation from before the fiscal year began until within three months of its close, and if, at the same time, excessive speculation had not put prices artificially high.

A matter of very great interest in connection with our foreign trade is the excess of exports or of imports, which is commonly called the balance of trade. In the past eight fiscal years the exports of merchandise from the United States have annually exceeded in value the imports of merchandise. This excess in 1883 amounted to $100,683,153. This amount, though quite large, has been exceeded in several other years, as is shown by the following table, which gives the excess of exports over imports in each fiscal year since 1876:

| Years. | Excess of exports. |
|---|---|
| 1876 | $79,643,481 |
| 1877 | 151,152,094 |
| 1878 | 257,814,234 |
| 1879 | 264,661,666 |
| 1880 | 167,683,912 |
| 1881 | 259,712,718 |
| 1882 | 25,002,683 |
| 1883 | 100,683,153 |
| Total | $1,307,253,041 |

The value of the exports of merchandise in the fiscal year 1883 was $823,805,819, which is almost equal to the combined exports and imports in 1870. Yet this very large sum has been twice exceeded—in 1880 and 1881, the exports of the latter year amounting to $902,377,346. The imports of merchandise in 1883 amounted to $723,122,666, which is only $1,500,000 below the largest amount ever imported into the United States in one year, which was in 1882.

During the ten years ended June 30, 1882, the products of agriculture embraced 78 per cent. of our exports of merchandise, and it is probable that this ratio was sustained in 1883. This shows the important part that the crops fill in our foreign commerce, and explains why a short crop year is always followed by a serious decrease in exports. The leading articles of exportation are cotton, breadstuffs, meat products and petroleum. The values of each of these products exported in 1883 are shown in the following table, in comparison with the values for 1882:

| Countries. | 1883. | 1882. |
|---|---|---|
| Cotton | $247,326,621 | $199,812,644 |
| Wheat (and flour) | 174,703,830 | 149,304,773 |
| Corn (and meal) | 27,736,880 | 29,840,031 |
| Meat products | 99,644,621 | 114,463,726 |
| Petroleum | 44,913,028 | 51,232,706 |

As the prospects at present are that the aggregate of the crops of the season of 1883 will be quite as large as in 1882, there will be a sufficient surplus of agricultural products in this country to insure as large exports the coming year as those of the past fiscal year, provided that the wants of foreign countries continue to be as great. The principal imports into the United States are sugar and molasses, wool and woolen goods, coffee, iron and steel, silk and silk goods, chemicals, cotton goods, hides, tin plates, tea, breadstuffs, linen goods and fruits. The values of these imports have not yet been separated by the Bureau of Statistics.

In the past two fiscal years there was a slight excess of specie exported over that imported, amounting in 1882 to $6,945,089, and in 1883 to $3,330,942. In 1880 and 1881 more specie was imported than exported, the excess amounting in the former year to $75,891,391, and in the latter year to $91,168,650. These two years are the only years since 1861 in which more specie flowed into the United States than passed out of it. The movement of specie, however, does not seem to be very closely connected with the movement of merchandise, though, of course, if we imported more merchandise than we exported, we would soon find a stronger demand for specie to be sent out of the country. But the balance of trade has so long been in favor of the United States, and for such large amounts annually, that one naturally expects to find specie continuously coming here from debtor nations to pay for supplies received. This is explained by the large foreign trade in United States securities of all sorts which are passing to and fro according to opportunities for profitable dealing on either side, and which take the place of specie to a considerable extent in international transactions. The cost of freight should also be considered in dealing with the balance of trade, as the value of the foreign merchandise at the port of shipment is given, and to that must be added the cost of bringing it here, which is done mainly in vessels owned abroad, and the money paid for freight goes out of the country. We have strong hopes that some day this system will be changed, and that American freighters will receive a large part of the money now pocketed by foreign vessel owners. It will not be until that time comes that this country will receive the full benefit it ought to derive from its enormous foreign commerce.

## The Duty on Iron-Wire Rods.

Much interest continues to be manifested in the question of the proper rate of duty on iron-wire rods. There seems to be little doubt, however, that the officers of the Treasury Department have come to the conclusion that all iron-wire rods should be admitted at the uniform rate of $\frac{6}{10}$ cent per pound. Assistant Secretary French intimated that he inclined to that opinion in the letter to Mr. James M. Swank, which was printed in our last issue. Since then dispatches from Washington have been published in various newspapers indicating that the question will be decided in favor of the lowest rate of duty, as named above. One dispatch states that the department will hold that the provision concerning charcoal iron does not apply to wire rods, and that "it is the purpose of the department to give "the benefit of the lower rate, and to admit "all rods of the proper size, and which shall "be stated to be imported for the manufacture of nails, screws, rivets and fence "wire, at $\frac{6}{10}$ cent. The department has "about determined that Congress has so "framed the law that, if importers desire "to evade it, they can do so by importing "round iron in coils or rods, pretending that "it is to be used for nails, &c., when it is "not. The Government will not be able to "follow the iron after it has paid the duty "and been delivered to the merchant."

A special dispatch to the New York *Tribune*, published in that paper on the 25th inst., contains the following statements, which go considerably further in showing the feeling upon this subject of the officers of the Treasury Department: "Mr. James, the "Chief of the Customs Division of the Secretary's office, called attention to-day, with "evident satisfaction, to the fact that in the "last number of *The Iron Age*, in which the "letter to Mr. Swank is published, with some "introductory comments, no effort is made "to controvert the position taken by the "acting Secretary. It appears probable "that the department will hold that if an "importer declares that the wire rod "brought in by him is, to quote the "letter, 'intended for or adapted to the "manufacture of rivets, screws, nails or "fence wire,' it must be admitted upon payment of a duty of $\frac{6}{10}$ cent per pound, instead of $1\frac{8}{10}$ cents per pound. Once admitted the iron may, of course, be used for "any purpose to which it can be applied."

We were not aware that, in refraining from making an argument in favor of levying the highest rate of duty on iron-wire rods, we were placing ourselves in a position to be considered as favoring the lowest rate. The correct interpretation of the law seemed to us so apparent that we did not, even when we saw Mr. French's letter to Mr. Swank, suppose there would be any serious trouble in deciding the question correctly, or that the department would need any suggestions from us in so simple a matter as this. But since our intention has been misunderstood, we will endeavor now to state our views on the point involved in this controversy.

There are four sections of the law which have a bearing on the question of the rate of duty on iron-wire rods, which are as follows: (1.) Provided, further, That all iron bars, blooms, billets, *or sizes or shapes of any kind*, in the manufacture of which charcoal is used as fuel, shall be subject to a duty of twenty-two dollars per ton. (2.) Round iron, in coils or rods, less than seven-sixteenths of one inch in diameter, and bars or shapes of rolled iron not specially enumerated or provided for in this act, [shall pay] one and two-tenths of one cent per pound. (3.) Iron or steel rivet, screw, nail and fence wire rods, round, in coils and loops, not lighter than number five wire gauge, valued at three and one-half cents or less per pound, [shall pay] six-tenths of one cent per pound. (4.) If two or more rates of duty should be applicable to any imported article, it shall be classified for duty under the highest of such rates.

Under these four provisions iron-wire rods, which are usually made with charcoal fuel, and are under $\frac{7}{16}$ inch in diameter, should pay the highest rate of duty here named, which is not $\frac{6}{10}$ cent per pound, nor $22 per ton, but $1\frac{8}{10}$ cents per pound. As the charcoal rate is intermediate between the highest and lowest rates here mentioned, it does not have a direct bearing in determining the rate of duty. If, however, it shall be decided that the specific designation of certain kinds of wire rods withdraws them from the general class of round iron less than $\frac{7}{16}$ inch in diameter, then the charcoal provision comes to the front with a direct bearing on the case that cannot be ignored. The circumstances under which the fourth provision above quoted was inserted in the tariff law conclusively show that it was intended to apply to precisely such cases as the one under consideration. That provision was adopted in the Conference Committee of the Senate and House of Representatives. It was known very well in that committee that the revised tariff had been shorn of the symmetry which it possessed when it came from the hands of the Tariff Commission, and that it was doubtless full of crudities, ambiguities and incongruities, and, therefore, that committee adopted this provision as an amendment to the tariff, which should serve as a rule in the settlement of disputed questions as to the proper rates of duty on imported articles.

There seems to be no difficulty in disposing of this question. The law is plain, and there is but one course open for the Treasury Department under that law. The question, however, forces itself upon us persistently, Suppose the amendment adopted by the Conference Committee had said the *lowest* duty should be levied if two or more rates should seem to be applicable, would there be any doubt about the application of such a provision in a case like this?

Now that the investigations of the Senate Committee on Education and Labor have been virtually completed, the uselessness of the whole undertaking becomes readily apparent. The work of gathering the information (if it can be so called) was beset with difficulties, and it is to be regretted that so much time should have been given to a subject yielding so few practical results. The particulars obtained from the different available sources were of little value, and add nothing to an intelligent discussion of the labor problem. It is safe to assume, in fact, that if the different social, political and economic reforms suggested were put in force, "confusion worse confounded" would be the result. This is shown by even a superficial inspection of the testimony. Thus, we find some who disapprove of trades unions, claiming that they discriminate against unskilled labor, while others again take an exactly opposite view of the question. One witness was in favor of placing cabinet makers at the head of the furniture business, submitting the management of the building trade to the builders, and so on through all occupations. The investigation has developed nothing of special interest or importance, and it is only the stenographers and printers who are likely to derive any benefit from it.

## Mexican Internal Customs.

One of the most objectionable features tolerated under the Mexican Constitution is the levying of an inter-State tax. Every individual State of the 27 in the confederation is environed by its line of custom houses, at each of which new exactions may be imposed. Nothing could form a more complete barrier to internal traffic excepting absolute prohibition. To transport freight by long lines of railway while such embarrassments exist is not less impracticable. It is not surprising, bearing in mind the rapidity of railway progress in Mexico, stimulated by American capital and enterprise, that the Mexican Cabinet propose to abolish State custom houses without delay. With this object a convention will assemble at the capital on October 1, in response to a call by the Secretary of the Treasury, each State being invited to send two delegates. Many of the States are so largely dependent on inter-State taxation for their revenue that a strong opposition might be expected were it not that the Secretary couples with the invitation a proposition to reimburse the States suffering from a suppression of the custom houses by substituting "a more equitable tax." The convention, we are told, will also discuss the best means to enforce the Constitutional article which prohibits States from imposing duties on exports. It is thus seen that American influence, through the legitimate fields of enterprise and industry, is working a radical revolution in Mexico. The important reforms now pressing upon public attention are such as must precede any adequate transformation of the neighboring republic in the interests of a higher commercial and industrial development.

Coincident with the several movements above noticed, the Secretary of Public Works, in a recent circular, calls attention to the opportunities for an enlarged traffic with the United States which are afforded by the new railway system. "Within a short "time," says the Secretary, "the intimate "contact of the two nations will awaken "important interests of reciprocal traffic, "and perhaps laws for the reciprocal advantage of the two countries may be enacted. "Under these conditions, resulting from the "neighborhood of the two peoples, one of "which gives to the other its raw materials "and tropical fruits in exchange for the "manufactures received, the commerce of "our coasts on both oceans must look to its "interests, in order that a new impulse may "be given to its transactions." With improved facilities for transportation, we shall no longer read that Mexicans burn the choicest ebony, rosewood, mahogany and cedar for fuel, or that they lack many important articles of manufacture which the people of the United States can furnish at a low cost in the greatest abundance. Under the proposed treaty, Mexico will admit free of duty nearly every product found on our export lists, and her commodities received in exchange will be no less acceptable.

## British Iron and Steel Exports.

Statistics are at hand of the exports of iron and steel from Great Britain in the month of July of this year. The total figures for the month show a falling off as compared with the months immediately preceding, but a much greater reduction when compared with the figures for the corresponding month in 1882. The following table shows the exports of all kinds of iron and steel to all countries in the month and seven months ended July 31, as compared with the corresponding periods of 1882:

| Commodities. | July. Gross tons. | | Seven Months. Gross tons. | |
|---|---|---|---|---|
| | 1882. | 1883. | 1882. | 1883. |
| Pig iron | 162,921 | 155,004 | 965,904 | 869,143 |
| Bar, rod &c. | 23,978 | 27,462 | 173,183 | 167,075 |
| Rails | 90,877 | 85,750 | 551,517 | 592,819 |
| Wire | 8,109 | 4,603 | 51,878 | 37,800 |
| Hoops, sheets and plates | 31,245 | 29,063 | 189,155 | 198,129 |
| Tin plates | 28,554 | 24,816 | 157,115 | 156,179 |
| Cast or wr't | 30,282 | 26,597 | 191,013 | 200,300 |
| Old iron | 10,967 | 8,026 | 81,025 | 56,613 |
| Unw't steel | 15,273 | 4,360 | 127,057 | 46,109 |
| Manufactures | 1,127 | 673 | 10,325 | 7,506 |
| Total | 403,333 | 361,414 | 2,498,172 | 2,333,791 |

As compared with last year, the month's decrease is 41,919 tons, and the seven months' decrease is 164,379 tons. It will be observed that, while every item in the monthly comparison shows a decrease, there are some items in the seven months' comparison which show an increase. Rails, "hoops, sheets and plates," and "cast or wrought" have been exported in larger quantity this year than in 1882, but their increase was not large enough to offset the shrinkage in the exports of other commodities.

The exports of British iron and steel to the United States have diminished very considerably, as will be seen by comparing the month and seven months ended July 31 of this year with the corresponding periods of last year, as follows:

| Commodities. | July. Gross tons. | | Seven months. Gross tons. | |
|---|---|---|---|---|
| | 1882. | 1883. | 1882. | 1883. |
| Pig iron | 36,357 | 35,208 | 274,171 | 168,801 |
| Bar, rod, &c. | 893 | 314 | 13,276 | 6,398 |
| Rails | 18,581 | 5,719 | 142,023 | 46,144 |
| Hoops, sheets and plates | 5,631 | 4,541 | 18,816 | 19,153 |
| Tin plates | 24,941 | 20,158 | 127,962 | 120,620 |
| Cast or wrought | 530 | 332 | 4,115 | 3,462 |
| Old iron | 6,106 | 3,080 | 59,665 | 36,143 |
| Unwrought steel | 11,359 | 1,131 | 104,349 | 21,041 |
| Total | 103,398 | 70,483 | 744,377 | 418,302 |

These figures would seem to indicate a rapidly decreasing trade with the United States, and this view is taken by some of our British contemporaries, but we find, on referring to the statements for the preceding months of the current year, that more British iron and steel were shipped to this country in July than in any other month in the year. This will appear from the following table, in which are given the total quantities shipped to the United States from Great Britain in each of the first seven months of 1883:

| | Tons. | | Tons. |
|---|---|---|---|
| January | 55,308 | May | 60,871 |
| February | 49,201 | June | 64,628 |
| March | 55,068 | July | 70,483 |
| April | 62,913 | | |

The increased shipments in July embraced pig iron, rails, hoops and sheets, and tin plates. The trade in bar iron, old iron and unwrought steel has shrunk to very small proportions, and will hardly increase in the present condition of the domestic market.

Taking the seven months collectively, however, and comparing the total with the trade of the first seven months of last year, we find that there was a falling off of 326,075 tons in the shipments to this country. No other country which buys iron and steel from Great Britain shows such a falling off as this. Germany and Holland come next, with a loss of 55,186 tons. British North America, Brazil and Italy also show losses, but they are not large. Every other country has increased its purchases from Great Britain. So general has the increased business been that there are many elements of consolation to British manufacturers in these figures for July. Outside of the trade with the United States there was an actual gain of 161,696 tons in the shipments this year over last year. So large a buyer of British iron and steel has the United States been, however, that the loss of its trade, or even of half its trade, makes a serious inroad on British business, and we can very well understand the anxiety with which our Transatlantic cousins are now watching the course of the iron trade on this side of the ocean.

## The Building Trades Strikes.

Probably no other movement would be apt to shed a more unfavorable light upon trades unions than that now being agitated in the building trades, and the easy concessions of contractors and builders cannot but produce a feeling of just indignation. The remarkable activity in building in this city within the past few years has, as might be expected, been attended by a corresponding increase of wages, and at the present time those following the trade are receiving pay equal to, if not in excess of, the average obtained in many occupations requiring capacity and training of a much higher order. But pecuniary interests, as it appears, are not at stake in the movement now on foot, and the strikes recently ordered by the Building Trades Union have nothing to justify them, based as they are upon the refusal of employers to discharge non-union men. No claims of low wages, excessively long hours of labor or unjust treatment have been advanced, and the whole proceeding must be considered as an encroachment upon the principles of republican liberty. As set forth in the columns of the daily press and confirmed by recent developments, the men whose interests are now in question have the alternative of joining the union or being deprived of employment, and it is to be greatly deplored that the tyrannical and despicable measures adopted are, in a number of instances, meeting with success.

Unlike the telegraph operators, whose demands were entirely legitimate and advanced in a manner calculated to arouse public sympathy, the time chosen by the adherents of the Building Trades Union for the strike seems to have been specially favorable, the greater portion of the work now in the hands of contractors being of such a nature as to make its interruption practically disastrous to their interests. To this, then, we may, in a great measure, attribute their ready yielding. It is, in fact, altogether improbable that employers would, under other circumstances, have so willingly sacrificed their privileges and self-respect in complying with demands of so absurd a character. Many of them, no doubt, yielded because only principle, and not money, was in demand, concession involving no expense, but refusal entailing certain loss. That the latter would unquestionably be the case is well shown in a number of instances where contractors were known to be under bond to have their buildings ready at a certain date or forfeit a stipulated amount per day for delay. Such conditions, it will readily be seen, offered advantages to the strikers which the latter were not slow to grasp. The fact, however, should not be lost sight of that every employer may hire whom he chooses, and that every man may or may not join any association whose purposes are lawful, and that any organization which undertakes to dictate or enforce its demands in matters of this kind by coercive measures can scarcely expect to meet with anything but public disapproval.

It is safe to assume that not a little surprise was experienced by the general public at the comparative ease with which the Western Union Company lived through the recent strike. As already pointed out on different occasions, this was due in a great measure to the fact that the business on hand at that time was of such a nature as to make delay a matter of little inconvenience or importance to customers. No meas-

ures were consequently taken by the latter to legally enforce a rapid transmission of their messages. From a short account, however, which we publish elsewhere in this issue, it will be seen that this feeling was not shared by all, and that, so far, at least one of the great number who have perhaps had a similar experience has obtained damages for refusal on the part of the company to send messages unless the sender would stipulate that they should be taken "subject to delay." The decision rendered by Justice Angel will undoubtedly be read with interest, and gives rise to anticipations of further proceedings of a similar nature.

### French Commercial Policy.

Propagating commerce by force of arms is the difficult problem which France has undertaken to solve in Tonquin. By so doing she threatens the peace of the far East, with a possibillity that the ultimate consequences may involve Goverments which thus far are merely spectators. Tonquin was at one time foremost among the States of Cochin China, but of late years has been the reluctant vassal of Annam. When France, ten years ago, actively intervened in the internal policy of Tonquin, China was perfectly in accord, but in the present crisis China is implacably hostile to her designs. An actual collision has at length occurred, in which 700 Annamese are said to have been killed, the French suffering only a trifling loss, but the test of strength was sufficient to show that reinforcements to the extent of some 10,000 men are necessary to insure success. Henceforth, the Colonial policy of France is expected to receive a new impulse. Whether this policy is for commercial aggrandizement or national prestige—a term synonymous with military glory—is of no consequence. France has proclaimed by her recent acts that her future Colonial policy is aggressive. According to M. Duval, a statistical writer of some authority, France now shares in the trade of Cochin China only to an insignificant extent, the combined value of her exports and imports, so far as concerns that country, being only about $1,000,000 out of an aggregate of about $20,000,000. It is shown, furthermore, that the entire French Colonial trade absorbs exports only to the amount of $10,000,000. We surmise that the real animus of French movements in Asia of late is disclosed in a recent volume of M. du Colland, entitled, "Historie de l'Intervention Francaise au Tong-king," in which he says: "Deprived "of its granaries, Lower Cochin China and "Tonquin, the Kingdom of Annam would "have been constrained to at once accept "our protectorate, and France would have "become forthwith the most considerable "power in the China Sea." It is evident that France would repeat English policy in India, and aspiring to give that commercial importance to Tonquin which is now enjoyed by Hong Kong, she would hope to establish a new route for commerce. To this end she would assure the autonomy of Tonquin by setting up a national King from among her rulers.

The Committee on Tests of Iron and Steel of the American Society of Mechanical Engineers have just sent out a circular explaining why the bill for the establishment of a United States commission failed during the last session, and asking members and friends of the motion to forward any information which they may have, and which bears on the success of the measure, to the committee, and to mention it to Members of Congress who are likely to have special influence in the matter, and also to exert any influence they may have with Members, directly or indirectly, toward the furtherance of the bill for the establishment of the Test Commission. It is expected that the bill will be introduced as soon after the opening of the session as possible, and hence will be likely to escape the fate of the former one, which failed simply from being left over with other business which could not be reached during the session.

The plan for the pedestal of the Statue of Liberty has, it is said, been finally adopted. This will consist of three parts. The lowest will be of granite or some other dark stone—ashlars decorated with broad shields bearing the arms of the different States of the Union, and separated from the middle part by bold cornices. In the middle the stonework will be of a rugged style, such as was used by the Etruscans, in which "the masses are squared, but left rough in front." Above this will come the third and highest part, with upper and lower galleries, and with a graceful row of pillars with Ionic capitals. Above this will stand the colossus. Mr. Richard Hunt is, we believe, the author of the latest plan, and the papers speak of the method by which the statue is to be attached to the pedestal as something exceedingly satisfactory. So far, however, no very definite particulars have come to hand in regard to what the plan is.

The Brooklyn Bridge is open, but foot passengers and vehicles only are getting any benefit from it. The great public, which desires to make the bridge the link in its travel from the City Hall and the distant parts of Brooklyn, finds no cars ready for it, and consequently travel takes its old course via Fulton Ferry. The bridge engineers make a great fuss over the care with which they are splicing the cable, arranging switches, and doing other details, but those who have watched the bungling management of the bridge from the first are apprehensive that, through some stupid blunder, another serious accident may happen when the cars begin to run. We sincerely hope that such may not be the case, though there is cause for the greatest anxiety in regard to the matter.

The iron furnaces and other large manufacturing establishments in the Lehigh Valley appear to be giving evidences of an improved outlook. At Bethlehem, Catasauqua, Easton and other points there were indications of renewed activity. The adjustment of the labor troubles at Bethlehem was a cause of special satisfaction, and it was believed that better days were at hand. Of the 11 furnaces near Pittsburgh, all are in blast except one, and the stock of metal on hand is said not to exceed 6000 tons, with a daily average consumption of 2500 tons.

The British exports of hardware and cutlery to the United States in the month of July last amounted to £40,547, which is considerably less than in July, 1882, when the exports of the same classes of goods to this country footed up to £47,393. In the first seven months of the present year this trade amounted to £253,037, against £287,016 in the corresponding period of 1882. The shipments of British hardware and cutlery have recently decreased to all countries, except to the East Indies and Australasia, which are increasing their trade.

**A Deep Artesian Well.**—The artesian well now being drilled in the cellar of Cyrus W. Field's new building at No. 1 Broadway will be one of the deepest and largest in this country, and the tools used are among the heaviest ever made for this purpose. The bore is 8 inches in diameter, the usual size being from 4 to 6 inches. The hole in this well is between 300 and 400 feet deep, and progress is being made at the rate of 100 feet a week. An abundance of water has been reached, but not in sufficient quantity to justify a discontinuance of the drilling. The auger and bit weigh 4800 pounds and are lowered into the hole by a cable. One end of the cable is attached to an immense walking-beam, by which it is raised and let fall with every puff of the engine, shaking the building with each stroke. A man stands constantly at the mouth of the well, turning the cable as the bit is raised, so that the boring is as perfectly done as if the rock were of pine and the auger of steel. The hole is round and smooth and almost polished by the constant friction. Every few hours the auger is drawn out and a large brass syringe inserted to suck out the rock sand which is made by the drilling. The bits are constantly being dulled by rocks, and a blacksmith's forge is necessary to sharpen and temper them to their work. One bit lasts usually about four hours, when it is removed and another one put in its place. Mr. C. J. Bushnell, the contractor for the work, estimates that the well will cost nearly $15,000 and will yield about 50 gallons of water per minute.

### Charles Wheeler.

The city of Philadelphia has recently lost through death one of her most prominent citizens, and one who has for a long time been very actively identified with the iron trade of the country. As a banker, a merchant, or a manufacturer, the name of Charles Wheeler was always indicative of financial strength, of sterling probity and of aggressive enterprise. Although he succeeded in accomplishing far more than hosts of his competitors in many branches of business have been able to do, yet his life was comparatively a brief one and fell many years short of the alloted three-score and ten. His death was sudden, and the attendant circumstances were distressing. On the morning of the 16th inst., accompanied by his son, Charles Wheeler, Jr., who is only 14 years old, Mr. Wheeler was on his way to Philadelphia from Newport, where he had been spending some time in his summer residence. The Newport boat reached New York City a little late, and it was necessary to hurry to the Courtlandt-street ferry of the Pennsylvania Railroad Co. to catch a Philadelphia train. When near Vesey street, on West street, about 8 o'clock, Mr. Wheeler suddenly fell in an apopletic fit. He was lifted to a stand in Washington Market, where attempts were made to restore him to consciousness, but they were of no avail, and he died in 15 minutes. The body was taken to the Twenty-seventh Precinct Station, and an examination by Dr. Messemer disclosed that death had ensued from syncope, the result of cerebral apoplexy.

CHARLES WHEELER.

Thence the remains were conveyed to an undertaking establishment in Greenwich street, and were afterward removed to Bryn Mawr, near Philadelphia, in the evening. Mr. Wheeler's son says that his father had given no indication of illness. We take the following biographical sketch from the *Bulletin* of the American Iron and Steel Association:

"Mr. Wheeler was born in Philadelphia on the 22d of August, 1827, just 56 years ago. In early life he entered the employ of Morris, Tasker & Co., pipe manufacturers, of Philadelphia, and some years later he was taken into the firm as a partner. In 1862 he retired from business worth $1,000,000. Fourteen years later he again entered the firm as the chief partner. Under his management the workings of the company have been extended widely. It now has offices in New York, Philadelphia, Bradford, Pa., and San Francisco. The firm represents the Pascal Iron Works, of Philadelphia, and the Delaware Iron Co., of Newcastle, Del. He was also a partner in the dry-goods house of John Farnum & Co., of Philadelphia. His wife is the oldest daughter of Mr. Farnum, who is deceased. Mr. Wheeler organized the Central National Bank of Philadelphia, and in 1873 he was elected its vice-president. He was a director in the Insurance Company of North America, the Girard Insurance Co., the Lehigh Coal and Navigation Co., the Pottstown Iron Co., the Crane Iron Co., the Connellsville Coal and Coke Co., the Western Savings Fund, the Central National Bank of Philadelphia, the First National Bank of Bradford, Pa., and the Seaboard Bank of New York. In politics, Mr. Wheeler was a Republican and a member of the Philadelphia Committee of One Hundred. He frequently declined political offices. He was a member of the Episcopal Church. Mr. Wheeler's family consists of a wife and eight children, the latter all minors. His estate is large, and includes real estate in Philadelphia and valuable properties at Newport and Bryn Mawr, the latter a suburb of Philadelphia. Mr. Wheeler was a brother of Andrew Wheeler, of the firm of Morris, Wheeler & Co., the well-known iron merchants.

"Mr. Wheeler was elected treasurer of the American Iron and Steel Association at its organization in Philadelphia on November 16, 1864, and served continuously in this important office until the day of his death, a period of almost 19 years. For nearly 11 years our official relations with him have been of an intimate character, and we can bear testimony to his uniform courtesy, patience and obliging nature. Although he was overwhelmed with business, we never saw a frown upon his face, nor heard from his lips an impatient remark. The funeral of Mr. Wheeler took place at Bryn Mawr on Monday evening, August 20."

The press of Philadelphia bears generous testimony to Mr. Wheeler's worth as a man and a citizen. His business successes had not spoiled him, but he was, to the day of his death, ever genial, kindly, approachable, liberal, public-spirited and unostentatious.

**Japanese Trade.**—The disadvantages under which the Japanese labor in their efforts to establish direct trade on their own account are instructively set forth in an article in the *Japan Gazette*. The returns of trade for 1882 show an increase in the exports from Japan of about $7,000,000, and a decrease in the imports of about $1,800,000. The increase in the export trade of last year was artificial, being due solely to the impetus to exportation given by the Government requirements for money. It was fully accounted for by two commodities—silk and rice, the exports of the former, valued at $19,261,000, showing an increase of $6,283,000 against those of the preceding year, and those of the latter, valued at $1,652 000, showing an increase of $1,391,000. The silk exports were the largest ever attained to by Japan. In 1876, when prices were double those now current, the declared value of the Japanese silk exports was only $14,306,000. Direct trade, as understood by the Japanese, is mainly confined to competition with foreigners in exporting silk and rice, and perhaps tea to a small extent. As every convenient port is closed to all ships not owned by Japanese, the direct business is restricted to such articles as will bear the cost of transport to places whence conveyance to foreign countries can be obtained. Now, not only are the Japanese deficient in the experience needed for the business, but their agents abroad, when they are Japanese, are distanced in the race. The foreigner can finance on much better terms than the Japanese; the former rarely incurs more than 5 per cent. interest per annum, while the latter, not having the same facilities, must seek assistance in the native market, in which rates range from 9 to 24 per cent.

Advices from Amsterdam are to the effect that the display of the United States at the coming Amsterdam Exhibition will be utterly inconsistent with American business ideas, which were so forcibly shown at the exhibitions of Paris, London and Philadelphia. The principal reason assigned for this is that the exhibition was not properly advertised in this country, particulars concerning it not having been made public until September, 1882, while other countries were at least a year ahead in their preparations. According to the Amsterdam *Daily News*, it is a fact, evidently little appreciated in this country, that Holland is the fifth in rank among the buyers of our products, and it is therefore hoped that the United States will come brilliantly to the front at the World's Agricultural Fair to be held at Amsterdam, in July and August, 1884, on the same grounds now being occupied by the Colonial Exhibition.

## SCIENTIFIC AND TECHNICAL.

### The Origin of Lightning.

In explaining satisfactorily the phenomenon of lightning, a difficulty is encountered in accounting for the enormous electric tensions which are necessary to explain the great length of the spark often observed. The theory is advanced by A. Fick that the high tensions are produced by the sudden concentration of electricity already existing in a free state. This concentration is caused by the formation of large drops of rain from the small vesicles of moisture existing in the clouds, by which the surface upon which the electricity exists is greatly diminished. The sudden formation of drops of water from the mass of aqueous vapor may be due to the advance of cold air currents. Mr. Fick endeavors to answer two objections which may be urged against this theory: 1. That in every rain storm lightning ought to be seen 2. That it ought to rain whenever it lightens. To the first objection he replies that the drops may be formed gradually, and not suddenly, in which case the tensions would be dissipated gradually; and to the second, that drops are always formed in connection with lightning, but that in falling to the earth they sometimes encounter a layer of dry air, and are absorbed in their passage.

### Radiometers with Curved Vanes.

Mr. George W. Evans remarks in *Science* that among the radiometers in a collection which he recently examined were two with curved vanes of silver. The radius of curvature was less than 2 cm. When placed in front of a lamp the concave side moves toward the source of heat. Mr. Evans found no satisfactory explanation of these movements. According to a recent article by Dr. Pringsheim, the convex side of these vanes is supposed to be at a higher temperature than the concave side. The grounds for such an hypothesis are not obvious, and it would seem hardly possible that an appreciable difference could exist between the surfaces of a thin sheet of silver. It is more probable that the air on one side of the vane is hotter than that on the other. Since the "kick" of a molecule depends on its increase in temperature, the vane will move toward the side on which the air is the warmer. Dr. Pringsheim mentions an experiment in which he brought the heat to a focus inside the radiometer at a point in front of the vane. He found that the air gave no evidence of being heated. Mr. Evans repeated the experiment with solar heat, using a lens of 3 inches diameter and 4 inches focal length. The heat in air was sufficient to ignite instantly a common parlor match. When the focus was kept in front of the vane of an ordinary radiometer for two minutes no appreciable effect was observed; the instant it touched the vane, however, it gave a start and began to revolve. This experiment shows that the effects observed with curved vanes cannot be attributed to concentration of heat rays from the vanes.

According to the kinetic theory, this rotation is set up only if the molecules arriving on the convex side of the vane receive a greater positive increment to their velocity than those arriving on the concave side. These conditions are satisfied in this way: If the vanes are warmer than the air, the particles leaving the vane in both directions have an increased velocity; but take, for instance, the particles moving in lines parallel to the axis of the concavity toward the vane from either side; those on the convex side are scattered by reflection; those on the concave side are brought to a focus at a distance (in this instrument) of less than 1 cm. from the vertex of the concavity. The molecules in the vicinity of this focus receive an increase of kinetic energy, and similar reasoning holds for the sets of molecules moving parallel to each other in any other direction. Hence, the molecules on the concave side are hotter than those on the convex side, though not necessarily so hot as the vane itself. Since the molecules on the concave side receive a smaller increase of velocity from the vane, they give it a smaller reactive push. The action of the case in a radiometer is very prettily shown by wetting it with cold water. The action is best examined with curved vanes, or with vanes of metal covered on one side with mica. The rotation is at first in the same direction as on heating, showing that the air has become cooled by contact with the glass, but is after a time reversed, showing that, by quasi-conduction through the air, the vanes have become cool, while the glass is regaining its original temperature.

### Filtering Distilled Water.

Herr Eiselt recommends the use of sponge for filtering distilled water. The filtration goes on with great rapidity, and the product is as clear as crystal. When filtered through paper, distilled water soon exhibits a sediment, which is never formed when filtered through sponge, so that the bottles scarcely need cleaning after several months' use. The apparatus that he employs consists of a bottle with an opening near the bottom, from which descends a bent-glass tube. This tube is about 6 inches long and 1 inch and 1½ inches in diameter; at each end is a perforated rubber stopper, bearing a narrower glass tube. The wide tube contains one or two long strips of fine sponge that have been cleaned with dilute hydrochloric acid and then dried. The bottle to which this filter is attached must not be larger than the one placed beneath to catch the filtrate. The sponge, of course, must be cleaned every few months.

# BUFFALO PORTABLE FORGES AND HAND BLOWERS.

Warranted Superior to any other make, and Guaranteed to give Perfect Satisfaction.

*For sale by all the leading Iron, Hardware and Machinery Dealers throughout the country.*

## BUFFALO FORGE COMPANY,

**BUFFALO, N. Y.**

Send for Complete Catalogue.

---

Terry's Wrought Iron

**BARN DOOR HANGER & RAIL.**

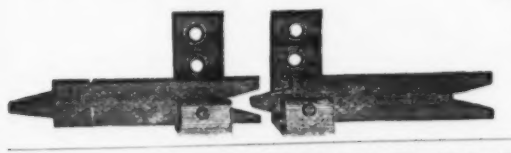
**UNQUESTIONABLY**
The Best Hanger & Rail
In the Market.

Will not break; cannot get off the track; snow, ice, or chaff cannot lodge on the Rail; will not warp or decay.

**Write for Circulars.**

Improved over Last Year!

**OUR NEW JOINT,**
With Dovetail Lap, as here shown, we guarantee to hold
**1000 Pounds Weight.**
if properly put up, and to be the BEST Rail on the market



**TERRY MFG. CO.,**
HORSEHEADS, N. Y.

---

## PENFIELD BLOCK COMPANY,

**LOCKPORT, N. Y.**

Chicago Railway Exposition, June, 1883.
**BRONZE MEDAL**
FOR THE
BEST PULLEY BLOCKS,
ALSO FOR THE
**BEST BAGGAGE BARROW.**

HENRY B. NEWHALL CO.,
105 Chambers Street, New York, and 47 Pearl Street, Boston.
S. H. & E. Y. MOORE,
163 & 165 Lake St., Chicago Agents.

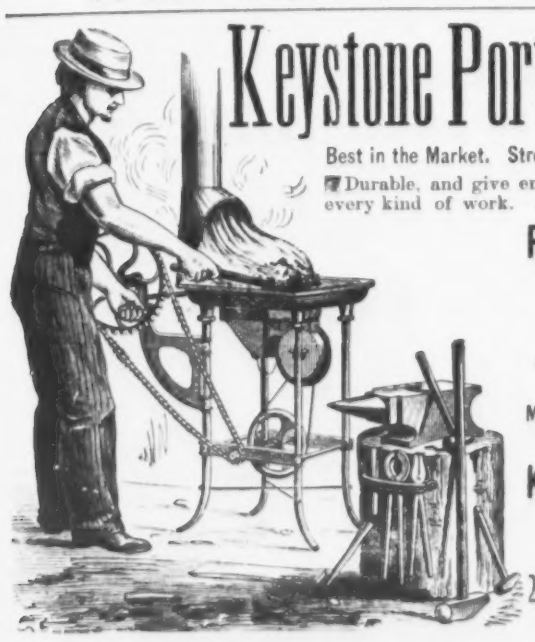
---

**MASTER-KEYED** BRASS **PADLOCKS,** in sets of any required number, made to order. Each lock has 2 *special keys*, which will unlock no other. Each *Set* has a *Master-Key* which will open the whole set—a great convenience in all shops and factories. Thousands in use. Satisfaction invariably given.

All who use **PADLOCKS FOR SECURITY** should examine **"Miller's 6-Lever,"** of which there are now made nearly 20 modifications. The *Franklin Institute* has awarded to the inventor the *John Scott Medal* and *Premium*, for account of the Board of City Trusts of the City of Philadelphia.

**FAIRBANKS & CO., Agents, 311 Broadway, New York,**
New Orleans. Pittsburgh. Buffalo. Albany Philadelphia Baltimore, &c.

---



## Keystone Portable Forges.

Best in the Market. Strong Blast and Easily Worked.
Durable, and give entire satisfaction. All sizes for every kind of work. Also

**Pressure Blowers**
AND
**Exhausters.**

Send for Catalogue.

MANNING, MAXWELL & MOORE,
New York Agents, 111 Liberty St.

**Keystone Portable Forge Co.,**
**204 North Fourth Street,**
**PHILADELPHIA, PA.**

---

## TRENTON LOCK & HARDWARE CO.

WORKS AND PRINCIPAL OFFICE:
**TRENTON, N. J.**

AGENCIES AND DEPOTS:
**JAMES M. VANCE & CO.**
211 Market St., Philadelphia.
**JAMES MARSHALL,**
48 Warren St., N. Y.

MANUFACTURERS OF LOCKS AND HARDWARE.

---

THE ORIGINAL AND ONLY GENUINE

# CHAMPION SAW.

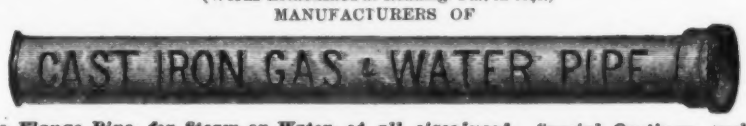
**We Caution** the Trade against buying **imitations** of this Saw stamped or etched the **"CHAMPION,"** as all such are infringements of our Trade-Mark.

**WHEELER, MADDEN & CLEMSON MFG. CO.,** Middletown, N. Y.

---

## MELLERT FOUNDRY & MACHINE CO., LIMITED.

(Works Established at Reading Pa., in 1848.)
MANUFACTURERS OF




*Also Flange Pipe, for Steam or Water, of all sizes used. Special Castings, such as Branches, Bends, Reducers, Sleeves, &c. Stop Valves, Fire Hydrants, Retorts, Lamp Posts, &c.*

**The Improved Canada Turbine Water Wheel.**
MACHINERY AND CASTINGS FOR
**Furnaces, Rolling Mills, Mining Pumps, Hoists, &c.**
CAR CASTINGS, GIRDERS, COLUMNS, BRACKETS, IRON RAILING, &c., &c.
**GENERAL OFFICE AT READING, PA.**

---

## Henderson's Patent Gas Furnace,

**Realizes Perfect Utilization of Coal as Fuel,**
**PRODUCES INGOT IRON FREE OF CARBON and INGOT STEEL OF ALL GRADES OF CARBON,**
From every kind of Pig Iron or Pig and Wrought Scrap Iron.
Apply to JAMES HENDERSON,
**BELLEFONTE, CENTRE CO., PA.**

---

## BARB WIRE MACHINERY.

We have made the Inventing and Manufacturing of this class of Machinery
**A SPECIALTY**
for eight years, and have the Largest and Best Facilities of any Manufactory in the country.

Will be pleased to give Estimates on receipt of Sample Barb.

## STOVER MFG. CO.,

**FREEPORT, ILL.**

---

## ILLINOIS IRON & BOLT CO.,

Nos. 20 to 26 Main St., CARPENTERSVILLE, KANE CO., ILL.,
MANUFACTURERS OF

BLACKSMITHS' TOOLS,

THIMBLE SKEINS

## LOCOMOTIVE JACK SCREWS,

**SAD IRONS, COPYING PRESSES and STANDS, &c.**

---

CHAMPION
**HOG RINGER**
RINGS and HOLDER.
Only double Ring ever invented. The only Ring that will effectually keep Hogs from rooting. No sharp points in the nose.

EAGLE BILL
**CORN HUSKER**
is the best Husker in the market. Farmers say it is the best. Use no other.

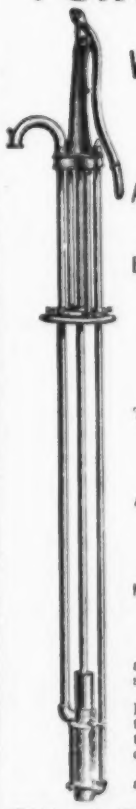
BROWN'S
**HOG AND PIG RINGER and RINGS.**
Only single Ring in the market that closes on the outside of the nose No sharp points in the nose to keep it sore

Ringers 75c. Rings, 60c. 10c. Holders, 75c. Huskers, 15c.

**CHAMBERS, BERING & QUINLAN,** Exclusive Manufacturers. Decatur, Ill.

---

## NEW CHAMPION FORCE PUMP.



HAS
**Vacuum Chamber and Air Chamber,**
PRODUCING
A CONTINUOUS FLOW OF WATER,
Both in Suction and Discharge.
AND THEREFORE
**WORKS SMOOTHER**
AND
**EASIER**
THAN ANY OTHER FORCE PUMP IN THE MARKET.
HAS
***Seamless Drawn Brass Cylinders and No Stuffing Boxes.***

Never Freezes in Winter, and is Not Liable to Get Out of Order.

With hose attachment it is valuable as a fire protection, and for sprinkling lawns, gardens, &c.
It is light, neat, and easy to handle, and yet strong, substantial and durable, and is adapted to all kinds of wells, dug, drilled or driven.
Send for descriptive circular and price list.

**CLARK BROS.,**
**BELMONT, N. Y., U. S. A.,**
SOLE MANUFACTURERS

---

## HILL'S Eureka Dryer.

**THE BEST**
In the Market
*For Indoor Use.*
Also Manufacturers of
**HILL'S**
CHAMPION DRYER
For illustration see last *Iron Age*. Circulars and discounts to the trade on application.

HILL DRYER CO.,
Worcester, Mass.

PATENT APPLIED FOR.

---

## AUTOMATIC CUT-OFF ENGINES

EMBODYING
A NEW SYSTEM OF REGULATION
**The Governor Weighs the Load.**
THE MOST PERFECT GOVERNING EVER OBTAINED.
Send for Circular B.

**BALL ENGINE CO.,**
**ERIE, PA.**

# GALLOWAY BOILER

IMPROVED UNDER PATENTS OF 1875 AND 1876.

Safety Economy in Fuel, Low Cost of Maintenance Dry Steam without Superheating, Large Reserve Power

ARE THE ADVANTAGES OFFERED BY THIS BOILER IN A PRE-EMINENT DEGREE.

3000 Horse-Power in Progress and for Immediate Delivery. Correspondence Solicited.

## EDGE MOOR IRON COMPANY

SOLE LICENSEE AND MANUFACTURER FOR THE UNITED STATES,

POST OFFICE, WILMINGTON, DELAWARE.

Philadelphia Office, 1600 HAMILTON STREET - - New York Office, 79 LIBERTY STREET.

WM. SELLERS, Pres. JNO. SELLERS, Jr., Vice-Pres. ELI GARRETT, Sec. and Treas. GEO. H. SELLERS, Gen. Supt.

A. FIELD & SONS,

MANUFACTURERS OF

# WIRE NAILS

Of Every Quality and Description.

Taunton, Mass., and 78 Chambers Street. New York.

# CROWN WATER METER.

ADOPTED BY THE

DEPARTMENT OF PUBLIC WORKS,

NEW YORK CITY.

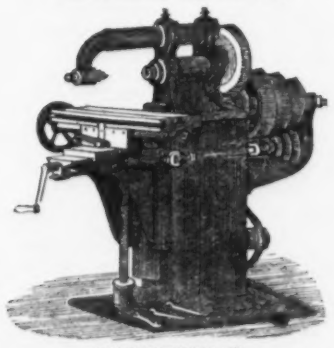
## National Meter Co.,

JOHN C. KELLEY, President,

No. 51 Chambers St., NEW YORK

W. R. EYNON & SONS

CLEVELAND, OHIO.,



MANUFACTURERS OF

MACHINIST TOOLS, MILLING MACHINES,

Die Sinkers, Universal Heads, Index Centers, Universal Vises, Grinding Attachment for Lathes, Centering Machines. Gear Cutting and Milling Done.

Office and Works, No. 73 Scranton Ave.

Self-Binders for The Iron Age

We are now prepared to supply our subscribers with an excellent self-binder for their papers, a cut of which is annexed. We call attention to the low prices at which it is offered. Address all orders to

DAVID WILLIAMS,
83 Reade street, New York.

HOOSIER SAW WORKS.

W. B. BARRY Saw Manufacturer

132 & 134 South Pennsylvania St., Indianapolis, Ind.

Swages, Gummers, Files, Belting & Emery Wheels.

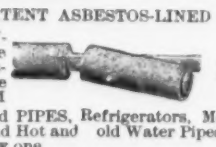
ALL WORK FULLY WARRANTED.

COVERINGS.

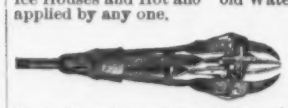
The Best Boiler and Pipe Covering Made!

THE CELEBRATED PATENT AIR SPACE COVERING for Steam Boilers and Pipes, Hot Blast Piping, &c., &c

TOOPE'S PATENT ASBESTOS-LINED REMOVABLE COVERING, made of Felt and Asbestos For use on STEAM



BOILERS and PIPES, Refrigerators, Meat Cars, Ice Houses and Hot and old Water Pipes. Easily applied by any one.



NATIONAL STEEL TUBE CLEANER for cleaning [illegible] r Tubes

Saves its cost every time it is used, and is endorsed by the best engineers.

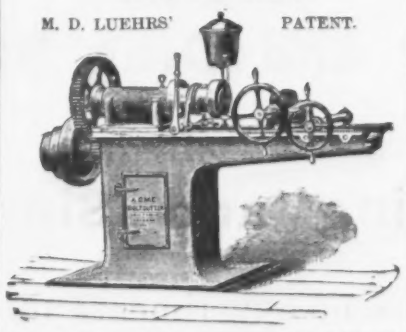
ASBESTOS MATERIALS, FIBRE, MILLBOARD PACKING AND CEMENT.

Address CHALMERS SPENCE CO.
131 First Avenue, 419 & 421 8th St., N. Y.
Pittsburgh, Pa.

"ACME" BOLT CUTTERS

WITH CAP DIES.

M. D. LUEHRS' PATENT.



Double Automatic Bolt Cutters, Single Bolt Cutters, ¼ in. to 4 in. Rapid Bolt Cutters. Nut Tappers, ½ in. to 1⅝ in. Rapid Nut Tappers, 3, 4 and 6 Spindles, Bolt Headers, four different styles. Bolt Pointers, Nut Presses, &c.

NOVELTY IRON WORKS

CLEVELAND, OHIO.

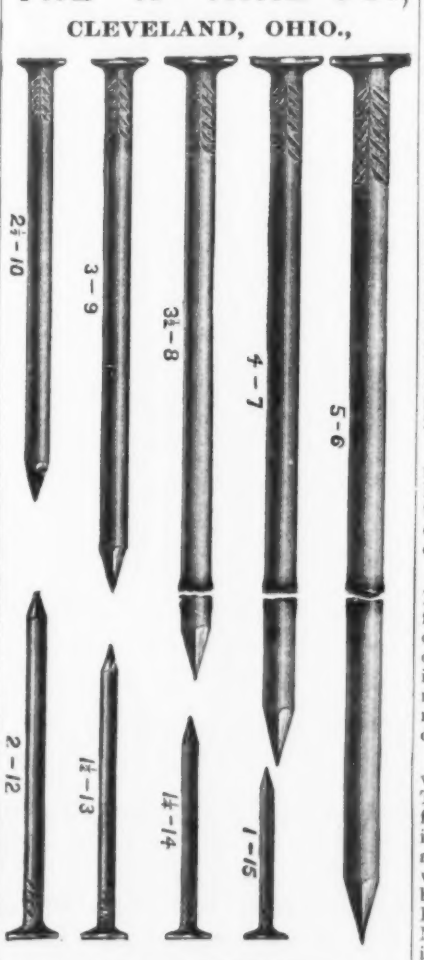
BARNES'

Patent Foot and Steam Power Machinery. Complete outfits for Actual Workshop Business. Lathes for Wood or Metal, Circular Saws, Scroll Saws, Formers, Mortisers, Tenoners, &c., &c. Machines on trial if desired. Descriptive Catalogue and Price List free.

W. F. & JOHN BARNES, Rockford, No. 2046 Main St.

THE HP NAIL CO.,

CLEVELAND, OHIO.,




MANUFACTURERS OF

WIRE NAILS

OF ALL KINDS.

Barbed or Plain Steel, Iron and Brass Nails, Cast Steel Wire Brads, Cast Steel Wire Finishing Nails, Cigar Box Nails, Escutcheon Pins, Wagon Nails, Clinch Nails, Hinge Nails, Wire Spikes for Track, Bridge and Dock Work, Tinned Nails, Galvanized Nails.

WORTHINGTON & SONS,

MANUFACTURERS OF

GRINDSTONES

FOR ALL PURPOSES.

Scythe Stones and Mounted Grindstones.

Cor. Front and River Sts., CLEVELAND, OHIO.

SCROLL SAWS

The "Challenge" and "Rival" are the finest foot-power Scroll Saws in the world, with or without Lathe attachment.

Price, $10 to $20.

New Catalogue free. Address

SENECA MFG. CO.,

Seneca Falls N. Y., U. S.

WM. ESTERBROOK,

Wholesale Manufacturer of

Coal Hods,

311 Cherry St., PHILADELPHIA.


## INDUSTRIAL ITEMS.

MASSACHUSETTS.

The Curtis Regulator Company, of Boston, have recently furnished the Foreign Exhibition Building in that city with a 5-inch pressure regulator to utilize the exhaust steam for heating purposes.

CONNECTICUT.

The Farrel Foundry and Machine Company, of Ansonia, have erected a 60-horse-power Westinghouse automatic engine for their foundry work, independent of their main engine and water-wheel. They are also using a smaller one as an independent power for their blower in the forge.

NEW JERSEY.

Messrs. Spaulding, Jennings & Co. have remodeled the plant in their rolling mill at West Bergen. They have disconnected their three-high 9-inch train from the main engine, and are driving it independently by a Westinghouse engine of 150 horse-power. The engine is 14 x 14 and makes 300 revolutions per minute. It stands between the train and the polishing rolls, and drives each by a separate belt. The belt driving the train has a speed of over 7500 feet, or nearly a mile and a half, per minute.

The Elizabethport Rolling Mill, at Elizabethport, with a capacity of about 750 tons per month, has been started up by R. W. Elliott, formerly superintendent of the Phillipsburg Rolling Mill. The mill employs 150 hands, and will be run on merchant bars, fish plates, spikes, &c. J. J. Lippincott & Co., of Philadelphia, have been appointed sales agents.

PENNSYLVANIA.

North Bros., No. 23 Race street, Philadelphia, have about completed a very important addition to their foundry and workshops. The new building is 93 x 33, two stories and basement. The upper floors will be used for finishing, packing and shipping goods, one general office and two private offices for the members of the firm. There will be a fireproof room for patterns in the basement, and, taken altogether, it will be one of the best arranged and commodious establishments of its kind in Philadelphia—their floor room being 7000 feet, besides outbuildings.

S. J. Cresswell, manufacturer of ornamental ironwork, at 23d and Cherry streets, Philadelphia, is making a large addition to his already extensive and well-known establishment, which seems to be always crowded with work.

The Sunbury Nail, Bar and Guide Iron Mfg. Co., have built a rolling mill and nail factory at Sunbury, which will be put in operation in two weeks. The works consist of two double puddling furnaces, one heating furnace, one train of rolls, 15 nail machines ready for work and 10 more machines on the way. John Haas is president of the company.

The Phœnix Iron Company, of Phœnixville, have just put in operation one of their Taylor Langdon patent gas ore roasting furnaces. According to present accounts, it is working very satisfactorily, and yields a product of from 40 to 50 tons per day of well-roasted ore. The company contemplate building several additional furnaces at Phœnixville. Mr. W. J. Taylor, of Chester, N. J., a well-known pig-iron manufacturer, is the inventor of the furnace, and all the ore that has been used at Mr. Taylor's blast furnace at Chester for several years past has been roasted in these furnaces. It may be of interest to remark that the ore furnace here considered is the only one in the country that uses gas as a fuel.

OHIO.

The American Bolt and Screw Case Co., of Dayton, have an exhibit of their goods at the Louisville Exposition under the charge of Messrs. W. H. Belknap & Co., who are taking many orders for them. The home and foreign trade of the company is constantly increasing, which is satisfactory evidence that their goods are appreciated by the hardware trade generally.

ILLINOIS.

The Calumet Iron and Steel Co., of Chicago, have just finished experiments which have culminated in the perfection and erection of a plant for the manufacture of steel nails. A couple of these nails have just reached us by mail, and for perfection of finish are certainly equal to anything in the nail line which we have ever seen. The company say that that the 10d.'s will be graded about 1000 nails to the keg more than iron nails. Judging from the samples before us, we should suppose that they might be driven into hard woods with the greatest ease. Their strength appears to be considerably greater than iron nails of the same character, and the samples bend very much like an ordinary so-called wrought nail.

**Railway Work in Australia.**—A correspondent of the *American Mail and Export Journal* writes from Sidney, New South Wales, that a "a new railway bridge is about being erected to span the Hawkesbury—one of our magnificent streams. Much agitation has risen as to whether the work should be done in the Colony. Opinions are divided, but the preponderance points to England or America to supply the superstructure. Experience has shown in this country that when ironmasters enter into heavy contracts with the Government to be completed within a given time, strikes of months' duration followed. Then one of the leading engineers did not hesitate to say that there was not skilled labor in the Colony to complete the work, and in the event of its being undertaken by Colonial contractors, the labor should also be imported. The value of the contract is about $3,000,000, but, should the work be done by local firms, it is estimated that it will amount to $4,200,000. This is a serious difference, and one that cannot be tolerated. The Edge Moor Iron Works Company, of Wilmington, on the Delaware, erected some magnificent bridges in Australia, and possibly the company may be induced to compete for the work. When the bridge is completed there will be a direct railway communication from Sydney to the Northern district. At present there is a marine trip to the port of Newcastle, and thence by the Northern Railway to the fertile agricultural lands and stanniferous regions of our New England district."

### The Age of Machinery.

From the New York *Shipping List* we clip the following article relative to this age of machinery and the work which is being done without the aid of hand labor. Even to the engineering brotherhood, familiar with what is being done, the figures given are simply astounding:

Fifty years ago Carlyle exclaimed that the age was mechanical—that individual effort amounted to little. If this was perceived half a century ago, the subsequent vast organization of the forces of a complex civilization makes it far more true now. The political economist who would marshal the forces affecting human society at the present time must not lose sight of machinery as a force affecting the welfare of nations. By the aid of new and improved machinery and steam the production of many useful and indispensable articles has increased faster than the consumption, with the consequence of periodical gluts in the market. The world can probably produce more in a single year now than it was possible with the appliances of a generation ago for it to have produced in a decade. Nowhere, perhaps, has the increase in the power of production been more conspicuous than in agriculture. The historian who would arrive at correct conclusions of the growth of this Republic, of the forces that bind it together, must take into account the machinery of the farm, affecting the interdependence of the States. They are concentrating forces, promotive of the National Union. They are far-reaching in their influence. Their power is felt beyond the Atlantic. The statesmen of Great Britain recognize them as factors in in the political problem of that realm. The first patent for a reaping machine was granted in 1833, but it was not until 1845 that they began to be used, except in a tentative way, Cyrus McCormack having built 150 in that year. Since 1850 more than 3,000,000 reaping and mowing machines have been constructed in the United States, and the annual manufacture is about 175,000. Since 1865 large sums of money have been spent in the production of machines which would not only reap, but bind the grain. What has resulted from this last effort of invention? With the sickle, at the beginning of the century, a man could reap and bind one-third of an acre of wheat in a day. Now, a man with three horses, riding at ease upon his cushioned seat, can cut and bind from 15 to 20 acres per day, with not a hand touching the grain.

Besides these self-binding reapers, there is the California harvester, a machine propelled by horses or mules, cutting off the heads of the grain, mowing a swath 20 feet wide, the machine cutting, threshing, winnowing and feeding into bags—cutting 50 acres a day. Before these inventions were brought out the Western farmer, during harvest, was at the mercy of a class of men known as "binders," who began in June, in the old border States, and moved Northward as the grain ripened, making the farmers' necessity their opportunity, demanding and obtaining from $3 to $5 a day, with board—materially reducing the profit of the crop to the farmer. Equally as great improvements have been made in the cultivation and gathering of the other important crops. The old methods of corn planting and culture were both tedious and expensive. To-day the Western farmer rides behind his team, planting 15 acres of corn, the rows running in both directions or with his seeder sowing evenly 20 acres of wheat—every kernel planted at a proper depth, the seeder so graduated that each acre shall receive a given amount of seed. Under the old way a man could plant one acre of corn per day. Invention enables him to increase his acreage twenty fold. We are to bear in mind that only in the United States, and to a lesser degree in England, is such machinery employed in agriculture. It is this use of machinery which is producing wealth among the farming community of the Western States unparalleled in any other age or nation.

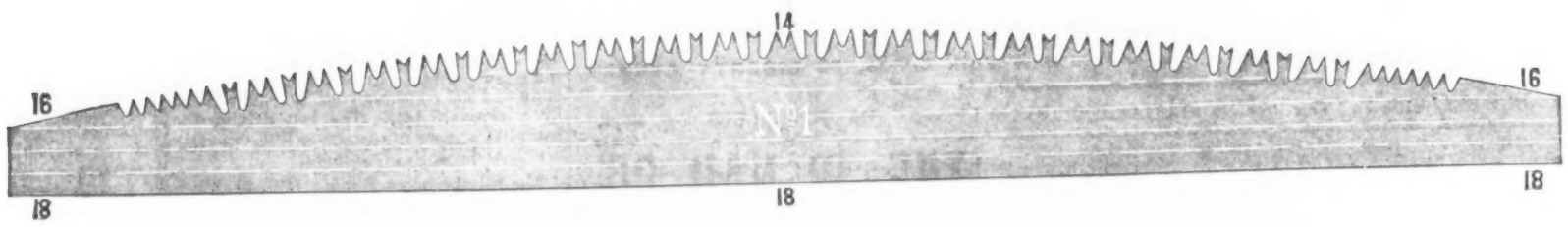
Down to 20 years ago or less, corn was cultivated by plowing between the rows and using the hand hoe, but invention has produced an implement, the cultivator, which so thoroughly does its work that the cost of producing corn has been materially reduced. In 1881 the State of Illinois produced 226,000,000 bushels, and this improvement in machinery alone is said to have made a saving of $6,000,000 in the cost of production. The center of agricultural production has been constantly moving West during the last 40 years, stimulating emigration to newer lands, by the inventive genius which has achieved its greatest triumphs on the far-reaching fields of the newer States and Territories. Rapid as has been the increase in the production of cereals, it will be a long time before the limit has been reached. It is estimated that the region suited to the growing of spring wheat is fully 200,000,000 acres. By her free gift of land to all who will take it; by her offer of citizenship to all who desire it; by her free schools; by the liberality and large-heartedness of her institutions; by the genius of her inventors—enabling her to provide bread for the hungry of every land—the United States makes her flag the emblem of the world's best hope, the brightest banner of all the ages.

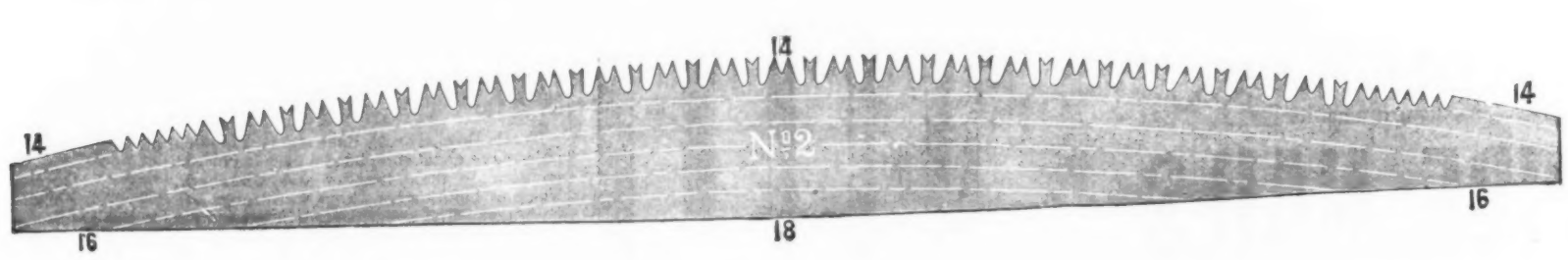
*Le Moniteur Industriel* urges the fortification, so to speak, of the Channel Tunnel by means of water, as a precaution to be adopted at both French and English ends which might secure both nations from any fear of invasion. The system proposed is to consist of a small basin somewhat inland, with communications which can be opened and closed between the sea on one hand and the channel on the other, and also a steam engine and pump for pumping the water in and out. The admission of 176,000 gallons of water, it is estimated, would render the tunnel impassable without destroying the apparatus for illumination, telegraphing, &c., which it would contain, and which could be extracted when the danger was over without excessive expenditure of time and money.

# THE "SIMONDS" SAW.

## SOMETHING NEW IN CROSS-CUTS.

**PATENTED DEC. 26, 1882.**




## DESCRIPTIVE CATALOGUE AND PRICES FURNISHED

——ON APPLICATION TO——

# SIMONDS MANUFACTURING COMPANY,

## FITCHBURG, MASS., or CHICAGO, ILL.

**WE MANUFACTURE FIVE DISTINCT LINES OF GOODS,**

——VIZ:——

**Circular Saws,**
**Crescent-Ground Cross-Cut Saws,**
**Straight-Ground Gang, Mill, Mulay and Drag Saws,**
**Planing-Machine Knives,**
**Special Knives (Paper-Cutting and Similar Knives).**

☞ Having for twenty years been engaged in a continued series of experiments to reduce the working of steel to a system, in addition to the great variety of special tools which we have devised and have in use—covered by many patents—we have made several discoveries relating to the physical properties of steel, which insure to us a marked advantage in the quality and uniformity of the temper of our goods, and which warrant us in claiming for each line specified a

## SUPERIORITY OVER ALL OTHERS.

## METALLURGICAL NOTES.

### The Langdon Gas Producer.

In a paper read at the Roanoke (Va.) meeting of the American Institute of Mining Engineers, Mr. N. M. Langdon, stated that considerable experience with producers of various kinds using anthracite fuel, in connection with the Taylor ore-roasting furnace, at Chester, N. J., with more or less unsatisfactory results, finally led to the erection of an experimental Langdon gas producer, which combines in its construction simplicity, durability and accessibility for cleaning and removing the ash and manipulating the fuel. It is adapted to the use of various kinds of fuel, and is capable of generating a steady and uniform supply of gas at a minimum cost. It has been in constant use day and night for about five months, and has given very satisfactory results.

The producer consists of a cylindrical furnace, preferably inclosed in an iron jacket or casing, having a bosh or inverted cone-shaped base, as in a blast furnace. It is provided with a bell and hopper, the bell being hung to a forked lever, and having guide flanges to prevent it from swinging, and an opening at its apex through which to insert a bar for manipulating the fuel, which, when not in use, is closed with a plug or stopper. Cleaning is effected through two small doors placed opposite each other at the hearth level, which, in order to facilitate the operation, is elevated above the floor. The doors are removable, and when closed are by their own weight and by means of beveled lugs held tightly against their frames, forming a practically tight joint. A blast of commingled steam and air is injected into the fuel through a series of tuyeres underneath the bosh, communicating with steam-jet injectors. A small flue also connects the door passages with the injectors, and a portion of the blast entering in this way prevents the doors from becoming overheated and warped.

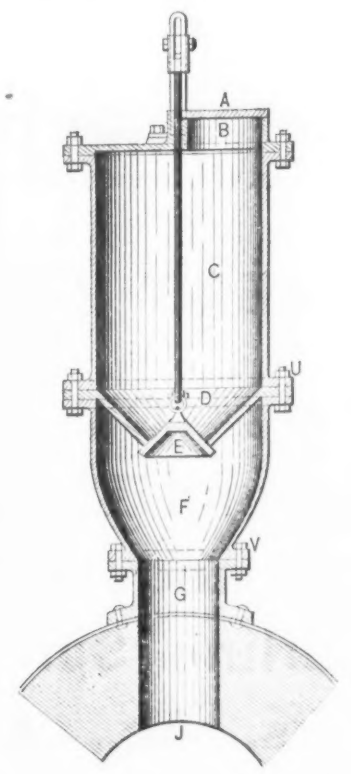
The air in combustion with the fuel (anthracite) forms carbonic oxide and nitrogen. The steam is decomposed and forms carbonic oxide and hydrogen or hydrocarbon gases, adding to the value of the combustible gas not only by the amount of hydrogen gases present, but also by the amount of carbonic oxide which is formed free from the diluting nitrogen. The steam also prevents the formation of hard clinkers, and the ash from sintering to the walls of the producer. No analysis of the gas has yet been made, but comparing it in result with gas previously used, containing 25 to 28 per cent. carbonic oxide, for roasting and desulphurizing ores, a saving of 15 per cent. in quantity and 15 to 20 per cent. in quality of fuel is effected. The gas passes off through an exit flue at one side near the top, which is provided with a damper. In cleaning, the fuel in the upper part of the producer is held up by the sloping walls of the bosh while the ash below is removed. After cleaning, the fuel is settled and evenly leveled or distributed with a bar introduced through the opening in the bell. Both anthracite and bituminous coal and coke dust have been used, the usual practice being ⅔ to ¾ pea coal and ⅓ to ¼ coke dust. It is obvious that charcoal braize, peat, &c., can be used advantageously.

### Solid Steel Castings.

Owing to the fact that considerable difficulty is experienced in making steel castings free from blow-holes or air bubbles, some interest is attached to a recent invention brought out by C. M. Pielsticker, of Kilburn, England. He proposes to use a vessel, preferably of a cylindrical form, and with a diameter equal to from one-third to one-half its hight. This vessel, which is to be made of fire-brick, or any other suitable refractory material capable of withstanding the temperature of the molten steel, is to be placed near the converter, so that the latter may be emptied directly into it. The metal may be heated from the outside by a furnace or by means of a forced gas blast, which may be temporarily introduced at the tap-hole near the bottom of the vessel. Inside of the vessel, all around its circumference and at about three-fourths of its hight, the inventor proposes to form a projection as a support for an interchangeable bottom, fitting closely to the sides of the vessel, and to be made also of highly refractory material. It is to be about 2 inches or more in thickness and furnished with numerous perforations varying in diameter from 1-16th to 1-8th inch, and slightly wider at the top than at the bottom. A second bottom or several similar perforated bottoms may be placed in the same way underneath, the first one having a suitable space between them, but in such a manner that the perforations of the different bottoms do not form one continuous line. Immediately underneath the last bottom is placed a vent-hole, which may be closed with a loosely-fitting plug of refractory material, acting as a valve and capable of opening toward the outside, and thus permitting the escape of gases from the inside of the vessel, while preventing the entrance of atmospheric air. The tap-hole is placed at the side of the vessel and immediately above the permanent bottom. In carrying out the process the molten steel is poured in at the top of the vessel and runs through the perforations of the first bottom in numerous thin streams. On its arrival at the second and subsequent perforated bottoms, if any, the surfaces of these numerous streams of molten steel are changed and the escape of the occluded gases is thus facilitated. The molten metal finally collects at the bottom of the vessel, whence it may be drawn off, and the gases pass out through the vent-hole already mentioned. The theory of the inventor is that the molten steel, being forced by its own gravity through the small holes in the first perforated bottom, causes compression of the inclosed gases, and as soon as the steel arrives at the open space underneath, the gases in consequence of their expansive force will readily pass through the thin stream of molten metal, and thus escape. The metal itself, on arriving at the next perforated bottom, is subjected to the same operation, and what gases may still be contained in it are again removed. This operation is repeated for every perforated bottom, and the result, it is claimed, is a metal practically free from gases.

### Fronheiser's Blast Furnace Attachment.

It happens very often that in case of scaffolding, or when the cinder and metal, from some other cause, is too thick to run from the furnace, it is found necessary to introduce sand, chloride of sodium, fluorspar or some other chemicals or fuels of different kinds into the heart of the furnace. Under the present customary arrangements the blow-pipes are either taken down entirely and the material is introduced through the tuyeres, or a cap on the end of the blow-pipe is removed and the pipe filled with the materials, which will thus be carried into the furnace after the blast is again turned on. All this, however, necessitates turning off the blast for some




*Fronheiser's Blast Furnace Attachment.—Fig. 1.—Vertical Section.*

time, and, in consequence, cinder or metal is apt to run back into the tuyeres, causing considerable trouble.

The attachment shown in the accompanying engravings, and proposed by Mr. James J. Fronheiser, superintendent of the furnaces of the Cambria Iron Company, at Johnstown, Pa., is claimed to have overcome the difficulty, the material being fed into the furnace without any interruption of the blast. Fig. 1 represents a vertical section of the apparatus, Fig. 2 is an elevation, Fig. 3 is a top view and Fig. 4 shows the opening through which the materials are fed into the apparatus. Referring to the engravings, the following explanation will be found of value: C represents the hopper or receptacle for the material to be introduced into the furnace, B is the opening through which the material is introduced, and A is the valve closing the opening B. This valve is held in place by a clamp, Y, and may be opened by swinging it to one

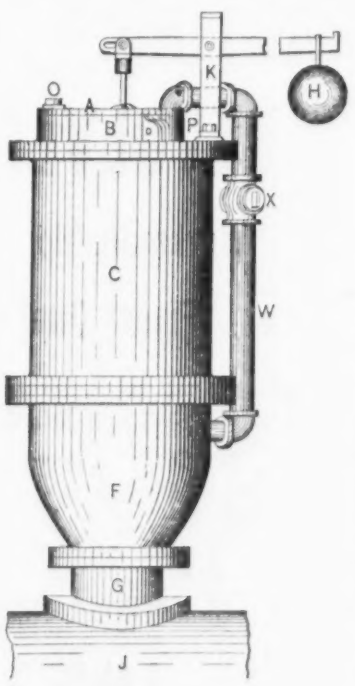



*Fig. 2.—Elevation.*

side, the bolt O serving as a pivot. E is a valve on the bottom of the cylinder or hopper C, and is manipulated by means of a rod and lever, as shown, the fulcrum of the latter being at K. H is a suitable counterweight, while F is a funnel-like extension of the hopper, fastened to it by means of bolts passing through the flanges shown at the top, and attached to the neck G in a similar manner. J is the pipe encircling the furnaces above the tuyeres, the neck G entering it, as shown in Fig. 1. W is a pipe connected with the funnel F below the valve E, and also connected with the hopper C at the top of, or above, the valve E. This pipe is furnished with a cock or valve, X, by means of which communication with the upper and lower portions of the apparatus may be established or cut off, as may be required. The method of operating the charging appliance is as follows: Removing the nut c (Fig. 4) enables the clamp Y to be taken off, and the valve A may then be opened by swinging it to one side. The material may then be introduced into the cylinder or hopper, after which the valve A is again closed and E is opened. The material, by its own weight, if the pressure be not too great, will then drop through the neck G into the pipe J, and will be carried directly into the furnace by the blast. In case the pressure against the valve E is very great, and the weight of the material to be charged into the furnace is not sufficient to overcome it, the valve X in the pipe W is opened, thus equalizing the pressure on both sides, and the material will then pass through without further difficulty. The hopper C can be made large enough to hold several hundred pounds of material, and by adjusting the counterweight H the amount of opening may be regulated, and the rapidity with which the material is introduced into the furnace will be entirely under control.

Every one connected with the arrangement of blast furnaces knows how troublesome it is to run a furnace on rich, gray foundry or Bessemer metal, especially when working silicious ores requiring the use of large quantities of limestone, and how often it happens that from some cause the lime is held back,

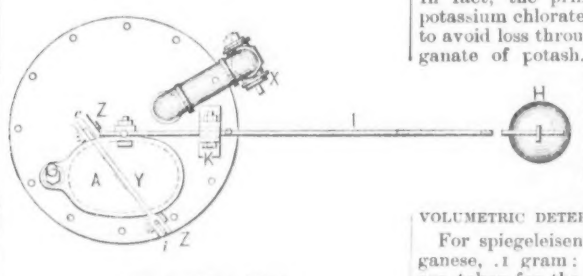



*Fig. 3.—Top View.*

and forms a line scaffold, which, when having dropped into the hearth of the furnace, is exceedingly difficult to remove. Many furnacemen insist on the necessity of burning off the furnace on sharp cinder every few weeks, so as to remove any accumulation of lime, &c., by changing the burden. This, however, entails the disadvantage of necessitating the output of a low grade of metal during that time. Mr. Fronheiser's apparatus obviates all this. Any accumulations of cinder, &c., may be readily removed from the furnace by introducing one or two hoppers full of sharp sand or common salt, without injuring or changing the quality of the metal produced.

### Determination of Manganese in Spiegel, Ferromanganese, Steel, &c.

According to a paper on the above subject, read by Magnus Troilius at the Roanoke (Va.) meeting of the American Institute of Mining Engineers, the method adopted in the laboratory of the Midvale Steel Works has been found very satisfactory. Some particulars relating to it will therefore probably meet with interest. Before giving the more detailed account of the manipulations, a review of some well-known methods and chemical facts may not be out of place. The "bromine and ammonia" process, as fully described in the tenth volume of the "Transactions of the Institute," was certainly an improvement on the methods in which fixed alkaline salts were used, as these gave invariably too high results, as generally carried out. But the separation of all the iron before the manganese was in both methods a source of great inconvenience and delay. The discovery of the insolubility in strong nitric acid of manganese dioxide ($MnO_2$) has been of great value, but the modes of determining manganese based on this discovery are very different, and the opinions as to the results somewhat conflicting. When a solution of iron in nitric acid (1.42 sp. gr.) is boiled with crystals of potassium chlorate, all the manganese present is precipitated as $MnO_2$, this compound being almost entirely insoluble in hot acid, and completely so in the cold acid. Thus, if, after boiling, cold

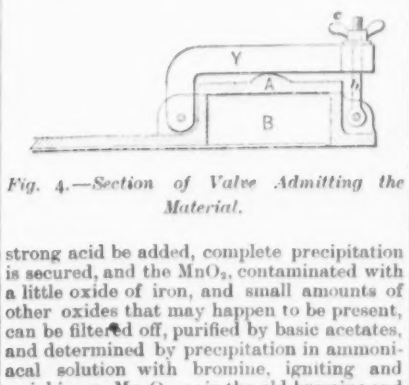



*Fig. 4.—Section of Valve Admitting the Material.*

strong acid be added, complete precipitation is secured, and the $MnO_2$, contaminated with a little oxide of iron, and small amounts of other oxides that may happen to be present, can be filtered off, purified by basic acetates, and determined by precipitation in ammoniacal solution with bromine, igniting and weighing as $Mn_3O_4$, as in the old bromine and ammonia process. This, indeed, was the first method used at Midvale, after abandoning the cumbrous basic-acetate processes. But even this proved to be too slow a procedure, and a volumetric method suggested itself as the nearest solution of the problem.

Under the supposition that all the manganese is precipitated as binoxide by nitric acid and potassium chlorate, Mr. Troilius added to the precipitate, after separating it as usual, a measured quantity of standardized ferrous sulphate solution, and titrated the amount left unoxidized, using potassium bichromate as standard oxidizing liquid. He expected to find the results by this process slightly higher than by the previous gravimetric process, owing to a slight loss in the latter in the basic acetate, and on the sides of the beaker when precipitating the manganese by bromine in ammoniacal solution. The results confirmed this expectation, and thus a practical proof was at the same time obtained that the manganese is really precipitated as $MnO_2$, and not as some lower oxide. That the manganese would be completely separated as dioxide by potassium chlorate and nitric acid, might, moreover, be anticipated by considering the following facts: 1. If manganese dioxide be boiled with potassium hydrate and potassium chlorate, it will be converted into potassium permanganate, easily extracted with water after evaporation to dryness. 2. Further, if potassium permanganate be boiled with strong nitric acid, all the manganese will separate as dioxide, insoluble in the excess of nitric acid; but, if weak acid be used, this reaction will not take place. Now, when precipitating the manganese by potassium chlorate in a nitric-acid solution, as described, a combination of these two reactions does evidently take place. A hot nitric-acid solution of manganese is in itself in a highly oxidizable condition, and on addition of the powerful oxidizer, potassium chlorate, it is brought to its maximum of oxidation, viz., permanganic acid. This can easily be seen if water be added while there are still crystals of potassium chlorate left undecomposed. The well-known pink color will then distinctly appear. But as there is an excess of strong nitric acid present, the above reaction (No. 2) will take place, and all the manganese be brought down as dioxide. How the manganese, in view of the facts referred to, could reach a lower state of oxidation than $MnO_2$, as has been erroneously supposed by some, is not easy to see. The whole tendency in this process is to convert the manganese into its highest state of oxidation, which would be permanent but for the existence of the compound, $MnO_2$, in soluble in nitric acid. In fact, the principal precaution in the potassium chlorate and nitric-acid process is to avoid loss through formation of permanganate of potash. This precaution is observed by cooling with strong acid after precipitation, and, in washing with strong nitric acid until all the chlorate of potash has been thoroughly washed out.

#### VOLUMETRIC DETERMINATION OF MANGANESE.

For spiegeleisen, .2 gram; for ferromanganese, .1 gram: and for steels, 5 grams are taken for the test. Spiegel and ferromanganese are dissolved in dilute nitric acid and afterward boiled with the strong acid; but steels are dissolved in hydrochloric acid, the solution evaporated to moderate dryness, the mass dissolved in strong nitric acid and boiled until the excess of hydrochloric acid has been removed. To the boiling solution in strong nitric acid small crystals of potassium chlorate are gradually added. Yellow fumes are given off, and soon a brown precipitate appears. A few more crystals are then added, and boiling continued for a few minutes. The solution should not be too concentrated when adding the potassium chlorate, as then violent explosions will occur ($ClO_2$). Add an excess of cold, strong nitric acid, allow to settle, and filter on asbestos, by aid of the suction pump, in a glass tube. Wash with strong nitric acid and finally with cold water. Blow the contents of the glass tube back into the beaker in which the precipitate was made, and add from a pipette 100 c. c. of a sulphuric-acid solution of ferrous sulphate containing about 10 grams of salt (or 2 grams of iron) in 1 liter. Run in boiling water, and stir until no small lumps of precipitate are visible. Transfer the solution and the asbestos to a large porcelain dish, and titrate with standard potassium bichromate (14 grams of $K_2Cr_2O_7$ to 1 liter). The end reaction is most delicately observed by mixing drops from the solution with small drops of a solution of potassium ferrocyanide ($K_8Cy_{12}Fe_2$) on a porcelain plate. The solution of $K_8Cy_{12}Fe_2$ will be of proper strength when a small crystal of the size of a pea is dissolved in 100 c. c. of water. The solution of the bichromate is standardized by means of ammonio-ferrous sulphate $\left(\frac{(NH_4)_2}{Fe}\right)2SO_4 + 6H_2O$, containing one-seventh part of iron. The iron standard multiplied by .491 gives the manganese standard, according to the following formulas:

1. $MnO_2 + 2FeO = MnO + Fe_2O_3$.
2. $6FeSO_4 + K_2Cr_2O_7 + 7H_2SO_4 = 3Fe_2 3SO_4 + K_2SO_4 + Cr_2 3SO_4 + 7H_2O$.

A determination of this kind can be easily completed in two hours. In the case of spiegel and ferromanganese, however, still more rapid results may be obtained by using an indirect method, determining the iron by standard bichromate, and deducting for silicon, phosphorus, copper, carbon, &c., a figure obtained from Professor Ledebur's table: For iron, less than 20 per cent., deduct 7.5 per cent. For iron, 20 to 45 per cent., deduct 6.5 per cent. For iron, 45 to 65 per cent., deduct 6 per cent. For iron, 65 per cent upward, deduct 5.5 per cent. This gives the manganese, by difference, within .5 per cent., and this is, for all practical purposes, sufficient. As the direct method, however, can be carried out in a very short time, both methods should always be used for control. If metals, such as lead, cobalt, &c., be present when precipitating the manganese with potassium chlorate in nitric acid, too high results may be obtained, owing to the formation of the higher oxides of these metals. But these metals do not generally occur in such quantities as to cause any serious error, not even in the ores used for the manufacture of spiegel and ferromanganese. The bichromate is preferable to the permanganate for iron determinations generally, and for the manganese determination just described the permanganate is inadmissible, except with special precautions, particularly when oxalic acid is used instead of ferrous sulphate. The permanganate, being an excessively powerful oxidizer, will be decolorized by any organic matter that may have come from the asbestos or other sources, while the bichromate does not alter from this cause. This fact is very apparent when a sulphuric acid solution of oxalic acid is titrated with permanganate at a temperature of about 70° C. Oxalic acid is best titrated in nitric-acid solution at a temperature of 60°, but this could not be applied for the manganese determination in question, although it is very suitable for lime determination in ores (Eggertz). The bichromate solution can be used even for titrating hot hydrochloric-acid solutions, although the end reaction in this case is not so distinct as when a hot sulphuric-acid solution, which is less oxidizable, is used. In a sulphuric-acid solution the titration proceeds with ease and delicacy, the color becoming more and more light-blue on the porcelain plate, until the last $\frac{1}{10}$ c. c. of the bichromate produces a decided brownish tint.

The bichromate has also the advantage of being a cleaner liquid, not liable to stain, and of being easier to keep than the permanganate. It is possible, it is true, to preserve the permanganate standard solution so that it does not change for a long time, but this requires greater precautions than the bichromate. Another great advantage in using the bichromate is that one may use a small spout with pinch-cock and rubber tubing on the burette, instead of the glass stop-cock which is necessary for the permanganate. Finally, where numerous manganese determinations have to be made, the economy of using ferrous sulphate and bichromate, instead of oxalic acid and permanganate, will soon be apparent. Bichromate titrations are rapidly replacing permanganate titrations on the European Continent. In England they have long been held in preference. Mr. Troilius also mentions that of all chemists that he met in Europe, the "bichromate men" have been experts on the permanganate as well, while the "permanganate men" have known but little about the bichromate method. In conclusion, the annexed table, showing comparative results obtained by different methods, may prove interesting:

| | Gravimetric. | | | Volumetric. | |
|---|---|---|---|---|---|
| | Basic acetate and bromine and ammonia process. Per cent. of manganese. | Eggertz's fixed alkali method with acid wash water. Per cent. of manganese. | $HNO_3 + KClO_3$ and bromine and ammonia. Per cent. of manganese. | $HNO_3 + KClO_3$ and bichromate. Per cent. of manganese. | Indirect, Bichrom. and Ledebur's table. Per cent. of manganese. |
| Ferromanganese | ..... | ..... | 60.331 | 60.230 | ..... |
| Ferromanganese | 73.31 | ..... | ..... | 73.540 | 73.30 |
| Spiegel | { 10.004 / 9.986 | ..... | ..... | 10.144 | ..... |
| Steel | .62 | .65 | ..... | .611 | ..... |
| " | ..... | ..... | { 1.372 / 1.375 | 1.432 | ..... |
| Pig iron | 1.72 | ..... | ..... | 1.77 | ..... |
| Steel | ..... | ..... | .522 | .531 | ..... |
| " | ..... | ..... | 1.05 | { 1.06 / 1.064 | ..... |
| " | ..... | ..... | .456 | .467 | ..... |
| " | ..... | ..... | .552 | { .55 / .571 / .561 | ..... |
| " | ..... | ..... | .331 | .351 | ..... |
| " | ..... | ..... | .461 | .480 | ..... |

### A New Gas Assaying Furnace.

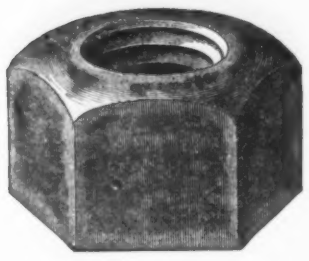
Among other ingenious forms of apparatus for the utilization of gas as a medium of heat devised by Mr. Thomas Fletcher, of Warrington, England, we find several patterns of furnaces—some for crucible work, others for muffle processes. Certain of these require a blast to reach the requisite degree of heat—others only the natural pressure of the gas. In the latter class is one furnace which seems to have escaped attention as an assaying furnace, owing to the fact of its being intended mainly as a furnace for melting small quantities of lead, copper, brass, &c. The form is that of the reverberatory furnace, the movable bricks when in place forming the roof. From another point of view it may be described as the muffle only of an ordinary furnace, but having the flame as well as the heat inside. The exterior dimensions are 20 inches long, 7 inches wide and 5½ inches deep. The nozzle at the burner should be connected with a ½-inch (or even a ⅜-inch) top by means of a full ⅜ or ½ inch rubber tube. A small stove-pipe, tightly fitting and of the length required, should be connected with a flue. The furnace will accommodate four 2¼-inch scorifiers, or from 6 to 10 cupels, or even more of the latter, by crowding. As, unlike a true muffle, there is no direct heat under the floor of the furnace, the scorifiers should be raised by placing each one upon an inverted scorifier, thus allowing the flame to play around and under them. In cupelling, the cupels must be raised to within 2 inches of the top (by means of inverted cupels beneath them), in order that the air may be freely admitted for oxidation.

The many advantages of this furnace may be enumerated as follows: Convenience of operating, whereby the assayer sees every stage and step of all operations, and so can tell when and where to improve or change; control of the source of heat, whereby the temperature can be regulated at any moment—a higher or lower heat, a reducing or oxidizing effect, being instantly produced; entire noislessness, in which characteristic it is the superior of all blast assay furnaces; saving of time which, in furnaces using coke, charcoal or coal, is spent in "bedding down;" freedom from dust and dirt; absence of waste, for when finished the gas may be at once shut off; comfort in manipulation, as compared with any solid-fuel furnace; furthermore, that it will not heat up a room (as do most other furnaces)—quite a desideratum in the summer time; finally, the remaining qualifications, which need not be dwelt upon, are simplicity of construction, durability and portability.

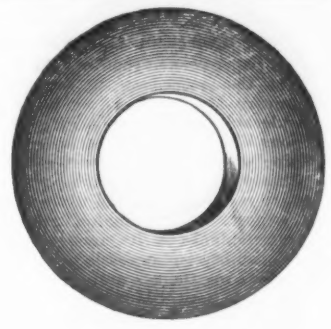
The consumption of gas averages 30 cubic feet per hour. It should be kept in mind that this furnace is not intended to take the place of a furnace required to be run from 10 to 12 hours per day, in which case, of course, a solid fuel will be cheaper. The price of the complete outfit of burner, furnace body, support, set of bricks, and one length of stove-pipe, is $20. It is manufactured by the Buffalo Dental Mfg. Co., of Buffalo, N. Y.

### Phosphor-Copper.

Mr. G. Otto, of Darmstadt, says *Engineering*, has brought out a new combination of phosphorus and copper, called phosphor-copper, containing 15 per cent. of phosporus, and intended for admixture with other metals. The favorable influence of phosphorus on copper and copper alloys is owing to its energetic reducing action on the oxygen which they contain, the result being extreme closeness of grain, combined with great elasticity. The new material may be added to copper alloys of all descriptions without any admixture of tin, such as brass, German silver, &c.; it can also be used in refining copper. It is supplied in tablets weighing about 2 pounds each, 15 to 20 pounds being sufficient for the production of 1 ton of phosphor-bronze, and only increasing the cost from one to three shillings per cwt. Most of the Continental Government works have used phosphor-copper for a considerable time with most successful results. To produce homogeneity in castings, both of this material and also of other metals and alloys, the same inventor has devised a stirrer or agitator, which consists of a handle having at its lower extremity a dovetailed groove, into



# RHODE ISLAND TOOL CO.,



SUCCESSORS TO

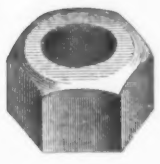
## PROVIDENCE TOOL CO.,

MANUFACTURERS OF

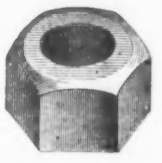
# Heavy Hardware, Railroad and Machinists' Supplies,

## SAIL MAKERS' AND SHIP CHANDLERS' HARDWARE,

COMPRISING



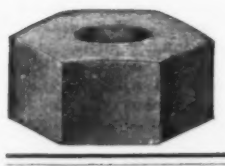
**Square and Hexagon Nuts, Washers, Chain Links, Turn Buckles, Clinch Rings, Hooks and Thimbles,**



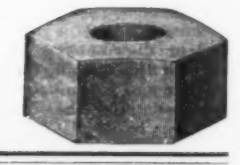
**Sister Hooks, Open Thimbles, Grommets and Grommet Rings, Grommet Knobs, Rigger Screws, Marline Spikes, Ship Scrapers, Norcross Iron Blocks, &c., &c.**

## DROP FORGINGS OF IRON OR STEEL MADE TO ORDER.

CORRESPONDENCE SOLICITED.



## PROVIDENCE, R. I.



# AMERICAN ARMS CO.,

BOSTON, MASS.,

RETAIL PRICE, $9.00.

Liberal Discount to Dealers.

## EXTRACTING REVOLVER.

Workmanship

Finest Quality

Just as convenient as a Smith & Wesson, and less parts to get out of order.

SOLE AGENTS:

SCHOVERLING, DALY & GALES,

84 & 86 Chambers Street,

NEW YORK.

Have just issued a new Catalogue of our goods, the most complete list ever printed, which will be sent to Dealers (only those who carry Gun Goods in stock) on application. No goods retailed.

# The Iron-Masters' LABORATORY.

Exclusively for the

***Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.***

**No. 339 Walnut St., Philadelphia.**

With Branch at Warrenton, Virginia,

**J. BLODGET BRITTON.**

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.

| | |
|---|---|
| For determining the per cent. of Pure Iron in an ordinary Ore | $4.00 |
| For the per cent. of Pure Iron, Sulphur and Phosphorus in do | 12.50 |
| For each additional constituent of usual occurrence | 1.50 |
| For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances. | |
| For determining the per cent. of Sulpnur or Phosphorus in Iron or Steel | 7.00 |
| For each additional constituent of usual occurrence | 6.00 |
| For the per cent. of Carbonate of Lime, and insoluble Silicious Matter in a Limestone | 10.00 |
| For each additional constituent | 2.00 |
| For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal | 12.50 |

For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.

For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.

Printed instructions for obtaining proper average samples for analysis furnished upon application

**B. S. RANDOLPH,**
**Civil Engineer and Geologist,**
MARTINSBURG, W. VA.

Examination of and Reports on Mineral, Railroad and other property. Surveys, Maps, Plans, Designs, Calculations and Estimates for all kinds of Engineering Works. Refers to Wm. Keyser, Baltimore, Md.; W. W. Evans, C. E., New York; Hon. H. G Davis, Piedmont, W. Va.; Hon. J. N. Camden, Parkersburg, W. Va.; Jas. L. Randolph, Chief Engr., B. & O. R. R., Baltimore, Md.

# SHEET-IRON BUILDING MATERIALS.

**ROOFING.** Patent Cap Seam Roofing, in Four Styles. In Sheets or Rolls.

**SIDING.** Crimped Iron, for Siding or Roofing for Elevators, Mills and Factories.

**CEILING.** Paneled and Crimped Iron Ceiling. Durable, Attractive, Fire-proof.

Send for Prices and Circulars to

**A. NORTHROP & CO., 97 First Ave., PITTSBURGH.**

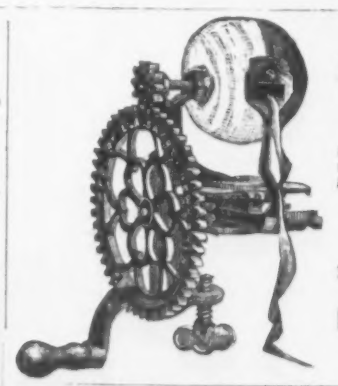
Iron Shingles. Double Cap, Corrugated, Crimped, Bead.

MOSER & THOMPSON,
Manufacturers of

**IRON ROOFING AND SIDING.**

Send for Circular and Price List No. 38.

28-32 River St., Cleveland, O.



THE

# WAVERLY APPLE PARER.

It has the quick return motion of knife. The Knife is screwed on. The pinions have square holes and are fitted on shafts with square ends. The parings cannot fall into the gearing. It is rapid, effective, simple. Send for circular.

**L. A. SAYRE,**

28 Orange Street, Newark, N. J.,

MANUFACTURER OF

Hardware Specialties, Mechanics' Tools, &c.

REPRESENTED BY

**W. H. ELPHINSTONE, JR.**

# FITTINGS.

Malleable and Gray Iron, All Kinds

STAR MACHINE WORKS.

Write for Prices.

Cleveland, O.

# STILLMAN & CO. Engraving ON WOOD

N.W. COR. FRONT & VINE

CINCINNATI OHIO.

**Print Your Own** CARDS, &c. Press $3. Larger sizes for circulars, &c., $8 to $50. For pleasure, money making, young or old. Everything easy, printed instructions. Send 2 stamps for Catalogue of Presses, Type, Cards, &c., to the factory

KELSEY & CO., MERIDEN, CONN.

which is inserted a piece of chalk, marble or other mineral capable of giving off carbonic acid gas. When the metal is molten it is stirred with this instrument and large quantities of gas are liberated with great force, the result being that a thorough admixture of the metal is produced. It is claimed that all the gases previously present are expelled, and that no trace of the carbonic acid remains, while the latter, accumulating on the surface, prevents the absorption of oxygen from the atmosphere.

### Treasury Decisions in Customs Cases.

In an action of the Government against John S. Leng, an importer, of this city, for the recovery of an alleged balance of duties upon three importations by Mr. Leng of "iron tank plates, punched and cut ready for use," Judge Brown, of the United States District Court, yesterday rendered a decision of interest to importers generally. The three entries were on different dates for goods that were described by Mr. Leng as "manufactures of iron not otherwise provided for," and subject to estimated duties respectively amounting to $1927.45, $1348.55 and $1835.05. These sums were, at the time of entry, paid to the collector, and in each case the goods were delivered to the importer. The goods were assessed by the collector as "boiler or other plate iron," subject to a higher rate of duty.

Mr. Leng, in November, 1880, appealed to the Secretary of the Treasury, who reversed the classification and assessment by the collector, thereby sustaining the position assumed by the importer. Agreeably with this decision, the duties were reliquidated by the collector in January, 1881, at the amounts paid by the importer upon the original entries, with the exception of $11.90, which the importer paid at once. The Secretary of the Treasury, on February 24, 1881, made a further order reversing his previous decision and directing a reliquidation in accordance with the collector's original assessment and liquidation. Under the last order the duties were again liquidated, amounting to $4015.83 in excess of the amount previously liquidated and paid, to recover which and interest the present suit was brought.

Judge Brown in his opinion reviews at great length the legal powers of the Secretary of the Treasury in recalling or modifying judgments when once made and declared. He holds that, having once performed his statutory duty, he loses jurisdiction of the subject matter. His Honor says it is held that even the United States courts have no power, in the absence of statutory provisions, to review or annul their own final decrees after the expiration of the term at which they are rendered. Judge Brown says, concluding: "The general principles of law applicable to special statutory tribunals, the uniform course of decisions as to the binding character of their determination collaterally and their inability directly to recall, review or reverse them, except as specially authorized by law, are in accord with what seems to me also the language and the intent of Section 2931 of Revised Statutes as to the binding character of the Secretary's decision in effect upon both the Government and the importer, and it follows, therefore, that judgment should be ordered for the defendant."

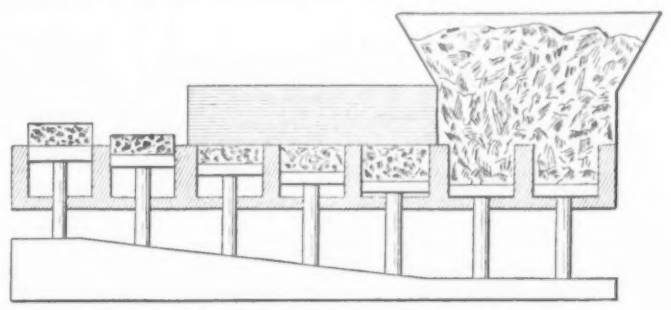
It may be of interest to state here that the reports of the commission appointed by the Secretary of the Treasury to consider questions arising under Section 7 of the tariff act of March 3, 1883, which repeals the duty on charges for packages containing imported merchandise, have been made public. The commission consisted of H. B. James, Chief of Customs Division, Treasury Department, chairman; A. P. Ketchum, Appraiser at New York; T. G. Rice, Appraiser at Boston; J. M. Fiske, Deputy Collector of Customs at Boston; E. B. Moore, Appraiser at Philadelphia; H. H. Goldsborough, Appraiser at Baltimore, and Joseph Treloar, representing the Collector of Customs at New York. Three reports were made by the commission.

The first, which is signed by Messrs. James, Goldsborough and Treloar, takes the ground, as matter of law, that the purpose of Section 7 of the new law is to repeal only that portion of the pre-existing law which added to the actual market value or wholesale price of the merchandise the costs and charges incident to the shipment of the goods after they were put in a condition for the market as usually sold. The second report, which is signed by Messrs. Ketchum, Rice and Fiske, is in effect that the law abolishes duties on coverings of any kind, and that the dutiable value of imports is now to be determined by ascertaining the value of the naked merchandise, without reference to any other elements of cost whatever. The third report, which is signed by Mr. Moore, maintains that the repealing clause of Section 7 exempts everything from payment of duty that can fairly be considered a covering incident to the transportation and shipment of the merchandise, whether it forms the "outside" or "inside" coverings, or both. The report, while admitting that the power to include the value of any legitimate covering for purposes of transportation and shipment in the value of merchandise for dutiable purposes has been repealed, says that great care will be necessary to distinguish between what should be accepted as covering for transportation and shipment, and what should be accepted as merchandise.

The commission is a unit in the view that in any event the value of the exterior package covering, whether it contains the goods in bulk or whether it contains a number of smaller packages in which the goods are packed, should be excluded under Section 7 of the new act from the category of dutiable value, and that, too, without reference to the question whether the goods were bought in bulk and packed by the purchaser, or were bought in the packed condition by the party making the shipment to the United States. Mr. James, in transmitting the report to the Secretary of the Treasury, and commenting upon the disagreement of the commission, says: "There is a middle ground which might be taken, in which certain kinds of inner packages might be considered as exempt from duty, which are mainly those which are readily separable from the goods they contain. This field of discussion, however, is a very broad one, upon which we do not attempt to enter at present; but I am instructed by the commission to state its willingness to reassemble and consider that branch of the subject, and what packages shall be considered as dutiable and those which are not, upon further instructions that you do not construe the law as necessarily fixing either of the extreme limits stated in the reports submitted." The question of the proper interpretation of Section 7 of the new tariff law will be referred to the Attorney-General for an opinion.

### Machinery for Treatment of Coal Slack.

The machinery used in transforming dust-coal or "slack" into a manageable or merchantable condition has been usually either of the direct-acting press type or of the rolling-mill type, and for the cementing material, which is absolutely needful to insure the strength of the block or ball, a residual pitch from coal-tar distillation and a plastic clay mixture have both been employed. Each method of treatment and each cementing or hardening agent has its advantages, and probably the location or district in which the manufacture is carried on has as much to do with the choice to be made between them as any of the special qualities of either one. One of the troublesome features of the



*Machinery for Treatment of Coal Slack.—Direct-Acting Press for Treating Coal Slack.*

press method of making the blocks has been the wear due to the cutting and grinding properties of the sharp coal particles, and although the partial lubricating effect of the pitch or clay mixture tends to relieve this friction and wear, yet the machine can only be classed as among those upon which frequent repair or renewal of the exposed parts must be made in order that the maximum production may be fully maintained. Obviously, the best way to arrange for these repairs is to provide for the entire renewal of damaged parts by slipping out the old piece and putting in a new one; but some of these machines have not been so designed as to permit the simplest of all methods of repair. This grinding action is most severe when the compression of the block takes place in the box or mold while, in the course of the motion of the machine, the mold-plate or bed is revolving beneath the platen or frame of the machine, the pressure needed for the compression of the block being exerted from below by a suitable cam motion, as in Fig. 1. An important advantage of this kind of mo-

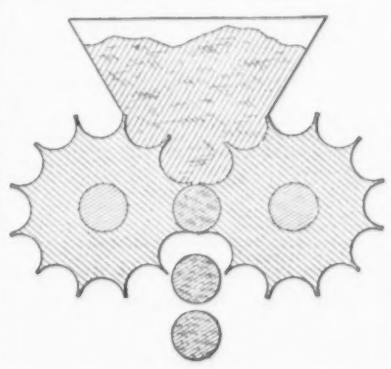


*Fig. 2.—Press of the Rolling-Mill Type for Treating Coal Slack.*

tion or arrangement of press is the readiness with which, by continuing the cam outline beyond the point at which the molded block passes out from beneath the frame, the block may be lifted up out from the mold, within which it fits so compactly, and delivered on to a conveyer for transfer to a car or wagon for shipment.

If a rolling-mill type of machine be used the feeding of the material is accomplished very readily into the pockets or recesses in the circumference of the rolls, as in Fig. 2, but the amount of compression which can be thus given within the practicable limits of the sizes of the parts is not very great and is wholly insufficient for the making or molding of large blocks. Hence the use of the roller type of machine is limited in this respect, as it is also in the character of the mixture which can be employed in it. The pitch mixture must be worked, or molded, at a temperature sufficient to soften the pitch to such an extent as to render it certain that it can be thoroughly mixed with the coal dust, so that each particle shall be fully coated and thus prepared to be joined to its neighbor. This renders the whole so sticky, and so liable to be troublesome in several ways, that it can be dealt with in a really successful way only in masses of considerable size, such that the mold boxes shall fill readily from the hopper above them, and yet not so large that the compressed blocks themselves shall be too heavy for a man to handle either by hand direct or in a shovel, as when throwing them into a furnace. The pitch blocks have been made in bulk about equal to ¼ cubic foot, while the clay balls, as passed through a roller press, do not usually exceed the size of common egg coal.

**The Folly of Strikes.**—One of the telegraph strikers, in his testimony before the Senate Committee on Education and Labor, quoted some figures which show the folly of strikes in so strong a light that it would seem impossible for an intelligent man to join in such movement after reading them. He said the statistics of labor in Europe showed that 2352 strikes had been recorded there since 1870. Of these contests, only 72 were won by the strikers, 189 were won by the employers, 91 were compromised, and the termination of the rest, about 2000, is unrecorded, but they are supposed to have been lost by the strikers. It appears, therefore, that the chances of success in a strike are very small indeed, if only the ultimate gaining of the object be considered the criterion of success; while if success be gauged by any measure of profit to the strikers, there does not seem to be one chance in a million, as is shown by further quotations from the records. The speaker further stated that during the 10 years beginning with 1870 the European strikers lost 9027 weeks, or 54,162 days. It is a little difficult to understand exactly what he meant by that, since there are only 520 weeks in 10 years, while the time mentioned appears to be too short to be considered as representing the equivalent of one man's time. He probably meant that this was the actual amount of time lost, in the aggregate, by all the bodies of strikers, for the amount of wages lost was stated at $22,237,750. It would be of interest to know the total number of men engaged in the strikes, as then the actual cost to each one could be figured. As it is, however, the amount lost to them, at the low wages paid to most laborers in Europe, is enormous, and must represent an amount of suffering by the men and their families hardly to be realized. The folly of striking for the purpose of coercing employers into paying higher wages is thus shown by the testimony of the strikers themselves.

### Sponge Culture in Florida.

We find it stated in a recent issue of *Science* that the United States National Museum lately received from Messrs. McKesson & Robbins, sponge importers, of New York, an interesting contribution representing the first successful attempts at sponge cultivation on the American coast. It consists of only four specimens, all of the finest or sheep's-wool variety, which were raised from cuttings at Key West, Fla., by the agent of the above-named firm. The localities in which the sponges were planted were not the most favorable for sponge development, and their growth was, therefore, less rapid and perfect than might otherwise have been the case. They were fastened to the bottom, in a depth of 2½ feet, by means of wires or sticks running through them, and allowed to remain down a period of about six months before they were taken up. Fully four months elapsed before they recovered from the injury done them in the cutting, which removes the outer "skin" along the edges of the section, and the actual growth exhibited was for about two months only. The original hight of each of the cuttings was about 2½ inches. One was planted in a cove or bight where there was little or no current, and its increase in size was very slight. The other specimens were placed in tide-ways, and have grown to from four to six times their bulk, which certainly promises well for the future of sponge propagation. Two hundred and sixteen specimens in all were planted at the same date, and, at the last accounts, those which remained were doing finely.

The chief obstacle to the artificial cultivation of sponges at Key West arises from the fact that the sponge fishermen infest every part of the region where sponges are likely to grow, and there is no protection for the would-be culturist against intruders. The enactment of judicious laws bearing upon this subject by the State of Florida, or the granting of special privileges conferring the right to occupy certain prescribed areas for sponge propogation, would undoubtedly tend to increase the annual production of this important fishery, which has remained at a standstill for several years past, mainly because of the partial exhaustion of several of the most extensive sponging areas. Accompanying these artificial growths was a collection of over 100 specimens of the various grades of Florida sponges of different sizes, each labeled with its supposed age, based upon estimates of the average rate of growth, by the sponge collectors. This entire collection now forms a part of the American exhibit at the great London Fisheries Exhibition.

### Brown, Bonnell & Co.

Advices from Youngstown, Ohio, under date of August 24, announce that the creditors of Messrs. Brown, Bonnell & Co., of that city, met there on that date to discuss the question of reorganization. Among the more prominent of those present were Messrs. Geo. A. Berry, of the Citizens' National Bank, and Sol. Schoyer, Jr., of Pittsburgh; Daniel P. Eells and W. H. H. Harris, of Cleveland; J. H. Van Dyke, Milwaukee; James Westerman, Joseph Firker and B. Magoffin, Sharon; E. Ogleby, Wheeling; J. E. McFarland, Meadville, and W. H. Baldwin, J. H. McEwen, Paul Wick, F. H. Matthews, W. H. Baldwin, H. M. Garlick, John I. Williams, H. O. Bonnell, Ralph J. Wick and A. B. Cornell, of Youngstown.

Mr. George A. Berry, of Pittsburgh, was elected chairman of the meeting, and W. H. Baldwin, of the First National Bank of Youngstown, secretary. Mr. Brown, the receiver, then submitted a detailed and complete report of the business done by the mills under his management. A report was also made showing that the efforts which had already been made toward the formation of a new company had met with the best of results, and that every one who had been approached on the matter heartily approved the plan. As a portion of the stock yet remained unsubscribed, Messrs. Paul Wick, James Westerman, H. O. Bonnell, Robert McCurdy and Wm. McCreery were appointed a committee to request the creditors who had not already subscribed to the new company to transfer the balances due them into stock. Before adjournment a resolution was unanimously passed complimenting Mr. Brown on his management, and requesting the court to continue his receivership until the new company was ready to take hold. It will be recalled that this proposed reorganization is the one which Mr. Paul Wick, of Youngstown, worked up among the creditors several months ago. The promoters of the scheme are Cleveland capitalists, who propose to take the plant, form a new company, assume the liabilities of the concern and pay them off in equal annual installments.

### Petroleum Exports.

The following statement, recently issued from the Bureau of Statistics at Washington, shows the exports of petroleum and petroleum products from the principal and all other customs districts of the United States during the month of June, 1883, and also during the 12 months ended the same, as compared with similar exports during the corresponding periods of the preceding year:

| Customs Districts. | Crude. | | Naphtha. | | Illuminating. | | Lubricating. | | Residuum. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gallons. | Dollars. | Gallons. | Dollars. | Gallons. | Dollars. | Gallons. | Dollars. | Gallons. | Dollars | Gallons. | Dollars. |
| Boston | ..... | ..... | 4,780 | 1,375 | 442,398 | 57,659 | 16,686 | 4,098 | ..... | ..... | 463,704 | 63,902 |
| New York | 4,050,820 | 307,842 | 1,485,117 | 94,154 | 38,727,085 | 2,012,725 | 764,485 | 167,416 | 626,850 | 47,352 | 39,854,357 | 3,529,369 |
| Philadelphia | 674,395 | 48,078 | 177,897 | 9,784 | 6,796,646 | 395,771 | 40,900 | 6,402 | ..... | ..... | 7,689,838 | 660,035 |
| Baltimore | ..... | ..... | ..... | ..... | 379,977 | 31,428 | ..... | ..... | ..... | ..... | 379,977 | 31,428 |
| San Francisco | ..... | ..... | 2,200 | 451 | ..... | 3,768 | ..... | 310 | ..... | ..... | 21,660 | 4,431 |
| All other districts | ..... | 205 | 5,123 | 675 | 100,774 | 12,223 | 7,941 | 2,233 | ..... | ..... | 114,643 | 15,151 |
| Total for June, 1883 | 4,725,420 | 355,940 | 1,675,117 | 106,441 | 46,465,360 | 3,013,614 | 830,322 | 181,739 | 626,850 | 47,352 | 47,923,069 | 4,305,086 |
| Total for June, 1882 | 2,934,990 | 212,378 | 1,527,943 | 123,609 | 48,720,457 | 4,165,018 | 728,422 | 157,059 | 160,482 | 11,500 | 54,070,294 | 4,669,564 |
| Total for 12 months ended June 30, 1883 | 52,712,326 | 3,914,041 | 17,070,537 | 1,368,286 | 419,821,081 | 36,926,574 | 10,182,342 | 2,326,632 | 6,145,356 | 442,646 | 505,931,621 | 44,913,079 |
| Total for 12 months ended June 30, 1882 | 41,304,997 | 3,129,511 | 20,313,098 | 1,800,143 | 488,213,033 | 44,188,854 | 6,508,100 | 1,492,396 | 3,715,362 | 212,862 | 559,054,590 | 51,232,766 |

It will be seen that there is a large gain in the export of crude oil over 1882, while in illuminating there is a considerable falling off in the total, though for the month of June there is a gain of 8,000,000 gallons over 1882.

### American Stoves in Mexico and South America.

Referring to an article on the exportation of American stoves, which appeared in these columns a short time since, a gentleman who has traveled extensively through Mexico and South America writes us, pointing out some of the difficulties encountered by American manufacturers with their goods in those countries. As the letter contains items that are of interest to every manufacturer who attempts to work up a trade in the countries named, we present it almost entire. The special difficulty that he points out—that of stoves not being packed for shipment in a manner to insure safe transportation—should certainly be an easy one to overcome. The advantages that he speaks of in favor of English stoves are also of a character not difficult to incorporate in American stoves. It is only by giving attention to matters of this kind that manufacturers can so manage their business as to meet the requirements of the countries in which their goods are to be sold:

*To the Editor of The Iron Age:* I have just completed reading the article on "The Exportation of American Stoves." I have for five years been traveling south of the Rio Grande River, engaged in selling goods for export from the United States. In this time I have not sold 100 stoves, although have often "talked them up." I find the following objection invariably raised, and know it be true:

They (the dealers) say that in most of the trial introductions of stoves they have made, the goods have been so badly packed that they have received them with parts broken sufficient to render them useless, and for that reason the business has turned out unprofitable, as to order anew the broken parts takes months, and it is far better for them to order the English stoves at a higher price, with the parts liable to break made of wrought-iron, not thin sheet-iron, but thick plates that can be thoroughly knocked down to save freight, and lighter in weight to save heavy duties that stoves are subjected to in most southern countries. Owing to the old style of open-grate cooking of the poorer class, I doubt if any very extensive business could be done, but I do not consider that any trade is in action at present, as the few stoves now ordered are just for the use of a few foreign (foreign to South America) families who are not accustomed to everything fried, and want home cooking at any cost.

Manufacturers often are carried away with the idea that their goods have acceptance in foreign countries, simply because some live traveler has induced his friendly inclined customers to try some new articles. The fact is, about one-third of the exports from the United States to Mexico and South America, are sold by the representatives of commission merchants, but not ordered by the customer, nor does he repeat the orders for goods once forced on him.

Yours truly, EXPORT.

### Nickel-Plating Decision.

As several subscribers have written us inquiring about the recent decision by Judge Blatchford in the nickel-plating controversy, we append the text in full for their information and that of others who may be interested. As will be noticed, this decision relates only to the motion for a preliminary injunction, and does not in any way affect the main question, which is yet to come up for final hearing:

*Circuit Court of the United States for the Southern District of New York.*

THE UNITED NICKEL COMPANY
*vs.*
THE NEW HOME SEWING MACHINE CO.

BLATCHFORD, J: I do not deem it necessary or proper to consider, on this motion for a preliminary injunction, the merits of the controversy between the parties, for there is a sufficient ground for denying the motion in the fact that the defendant has been doing for seven years what is now complained of, and that in 1880 the plaintiff sued the defendant at law, in the Circuit Court of the United States for the District of Massachusetts, for the infringement of the patent now sued on, and that such suit at law, after proceeding to a declaration, has been allowed by the plaintiff to remain unprosecuted. It appears that what the defendant did before such suit at law was brought was of the same character with what it has done since. The plated articles it now has on hand for sale, as parts of sewing machines, must have been plated by it since such suit at law was brought. The plaintiff does not plate, but licenses others to plate. It is shown that the defendant's license fee would be about $300 a year. That would be the amount of profits or damages to be recovered by the plaintiff. The defendant is shown to be pecuniarily responsible. Under the foregoing circumstances there ought not to be an injunction before final hearing.

For some time past the Belgian War Department has conducted a series of experiments at Valverde on the water-proofing of soldiers' uniforms by means of liquid alumina. The medical authorities have satisfied themselves that the articles of dress thus treated permit the perspiration to pass off freely, and chemical analysis has proved that the preparation used in no way injures the materials or destroys their color. More than 10,000 meters, or 10,936 yards, of materials, redressed two or three times over, notwithstanding the rinsing and washing to which they have been subjected after having been soiled and after constant wear, are said to have remained perfectly water-proof. The process is not very economical, and must be conducted on a large scale. The following, according to the *Journal d'Hygiene*, is the process employed: Acetate of alumina is obtained by making solutions of equal parts of alum and acetate of lead in separate vessels and then mixing them together. Sulphate of lead will be thrown down, leaving acetate of alumina in solution, which must be decanted. The materials to be water-proofed are soaked in this solution and then withdrawn without being wrung, and dried in the air.

The New York, West Shore and Buffalo Railroad is driving the power in its new shops in a novel and effective manner. Instead of belting from the engine to the line shaft in the usual manner, each shaft is driven by an independent engine coupled directly to it. To effect this, the arched doorway in the central brick partition is strengthened by piers, and a second opening left over it similar to a transom. The floor of this opening forms the foundation for a Westinghouse engine, which is set with its centers exactly in line with the shafting, to which it is coupled on each side. No regular engineer is employed, but the engine is considered a part of the shafting and is in charge of the wiper. The Westinghouse Machine Company have so far fitted up the shops at New Durham, N. J., with an engine 12 x 13, at Kingston and Syracuse each with a 9 x 9, and at Schenectady with a 7 x 7.

Col. De Voe, Superintendent of Markets in New York, has saved from the wreck of the old Washington Market the copper vane that swung there from 1812 until the builders tore down the old cupola last fall, and Mr. Douglas Smyth, the architect, promises that it shall point out the direction of the wind over the new market house. The new structure is to be of iron and glass and terra-cotta. They are driving piles for the foundations of the eastern half of the market, and this part of the structure is to be finished in December next.

## Special Notices.

### BOOKS ON CHEMICAL ANALYSIS AND ASSAYING.

*Brush.—Manual of Determinative Mineralogy.* By Prof. Geo. J. Brush; 4th edition, revised and corrected, 104 pages, 8vo, cloth; 1881 . . . . . $3.50

This treatise, with an introduction on blow-pipe analysis (constituting the determinative part of Dana's Mineralogy), contains tables for the complete classification and determination of minerals. The new system of nomenclature is adopted, and the work is one of the latest and most valuable books on this subject.

*Davies.—Metalliferous Minerals and Mining.* By D. C. Davies, M. E. 2d edition, revised, 148 illustrations, 450 pages, 8vo, cloth. London, 1880. . . . . $5

This book is an excellent and systematic description of the conditions under which metallic ores are found in the different countries of the world. It explains the origin of deposits, and defines the localities occupied by the various metallic ores, with practical details in the working of mines and the dressing of ores.

*De Koninck—Dietz.—A Practical Manual of Chemical Analysis and Assaying.* By L. L. De Koninck and E. Dietz; American edition, edited with notes and an appendix on iron ores, by A. A. Fesquet; 282 pp., 12mo, cloth, 1873 . $2.50

This work treats exclusively of chemical analysis and assaying as applied to the manufacture of iron from its ores, and to cast iron, wrought iron and steel. The apparatus and operations are described, and there is also a chapter on the assay of fuels. The work is very thorough, and the methods of analysis of the different elements are clearly intelligible.

Sent postpaid, on receipt of price, by

**DAVID WILLIAMS,**
Publisher and Bookseller,
**83 Reade Street, - NEW YORK.**

### ROLL TURNER WANTED

For a Steel Bar and Plate Mill. Must be a thoroughly competent man.

State experience and wages expected.

Address "STEEL,"
New Glasgow, N. S.

### Situation Wanted,

by Guide Roller. Good reference.
Address "ROLLER,"
Office of *The Iron Age*, 83 Reade st., New York.

### For Sale.

A Vertical Engine, built by Jacob Naylor. Nearly new; 12 x 16. Address
BLACK DIAMOND FILE WORKS,
G. & H. BARNETT,
21 to 43 Richmond St.,
Philadelphia, Pa.

### Wanted.

POSITION AS ENGINEER.

An Engineer and Constructor of Iron Works is open for a new engagement after the 1st of October next. Address "CONSTRUCTOR,"
Office of *The Iron Age*, 77 Fourth ave., Pittsburgh, Pa.

### Wanted.

A 25-lb. Bradley Cushioned Hammer, second-hand. Address, with particulars,
SITES & GILL,
222 and 224 So. Third Street, Philadelphia, Pa.

### For Sale.

One Dead-Stroke Justice Hammer, 15 lbs.
" " " " " 50 lbs.
One Allen Governor, 2-inch.
Address BLACK DIAMOND FILE WORKS,
G. & H. BARNETT,
21 to 43 Richmond St., Philadelphia, Pa.

### Mixed Screws in Bulk.

Packed in cases of 150 to 200 lbs. each. For price, address
GEO. E. WEAVER,
Olneyville, R. I.

### A Gentleman

of experience and steady habits is open for a position as Traveler for a house in the Iron or Steel trade. First-class references.
Address "ANGLES,"
Office of *The Iron Age*, 220 S. 4th St., Philadelphia.

### FOR SALE.

Nos. 1 and 6 Sturtevant Blowers; No. 2 do. Exhaust; Vertical Engines, 2 and 12 H. P.; Roper Hot Air do., 1½ and 3 H. P.; Otto Gas do., 1 H. P.; Riter Pumping do., 6-in.; Baxter do., 4, 6 and 10 H. P.; Planer, 20 x 16 x 4 (Fine), $200.; do., 29 x 2½ x 5 (Chain), $200.; Engine Lathe, 30 x 14, $300; Crane, 15 tons; 54-in Cupola. Purchases carefully made for parties at low rates.
C. R. BIGELOW, M. E.,
18 New Church St., New York City.

WANTED.—A position by a young man as Salesman with some first-class house. Having had 13 years' experience in the Hardware business, and an extensive acquaintance in the New York, Eastern and Canadian markets, I consider myself competent to handle a line of goods in any of the above districts.
Address "E. F., 78,"
Office of *The Iron Age*, 83 Reade St., New York.

WANTED.—A position as Salesman, or in any capacity where a thorough, practical knowledge of the General Hardware trade could be available. Active and of good address. Posted in buying in all departments. Address "J. E.,"
Office of *The Iron Age*, 83 Reade St., New York.

## Special Notices.

### FIRST-CLASS PAYING BUSINESS For Sale.

Parties having built up and thoroughly established an extensive and fine paying business, will sell the same, including several fine machinery specialties in iron and wood, and a jobbing business of every class of Gearing, Shafting, &c., and Foundry and Woodwork. Specialties have but little competition and are easily managed. The jobbing business includes a very fine collection of patterns in constant use, and controlling a very large jobbing trade. Also Machinery, Tools, Stock, &c., and good will.

Above business is constantly growing, and has every year cleared **a very large amount of money.** Is centrally located and upon a large and never-failing water power, with canal through premises and excellent railroad facilities. The reason for owners offering same is because the business has grown too large for present buildings and facilities and is contantly growing, and they desire to remove one specialty, for which they have lately secured letters patent and requiring special buildings and machinery, to the center of its market in the West, which will relieve sufficiently the present facilities now overcrowded. Or should any parties desire, we will sell the specialty and retain the other business.

The straightforwardness of above facts can be readily ascertained.

Any young man or old business men having money will find either business a very pleasant and profitable one. To save annoyance or trouble, we will answer inquiries only from parties with commercial standing or who are vouched for by bankers or other responsible parties. Would prefer parties with means, interested and looking for an established, paying business, to call personally upon us with proper letters and introductions.
E. W. ROSS & CO.,
Fulton, N. Y.

### To Lease.

From May 1, 1884, for a term of years, at a low rental to satisfactory parties, the manufacturing property at New London, Conn., lately occupied by the Brown Cotton Gin Company. The grounds comprises over 80 000 square feet. The buildings and sheds under roof measure over 25,000 square feet, of which about 20,000 feet are metal roofs. An Engine, Boiler, Shafting, &c., &c., are on the premises. The property is very conveniently located for manufacturing purposes. Its entire easterly line is bounded by the land of the Shore Line Division of the N. Y., N. H. and Hartford R. R. Co.

For further particulars, apply to
Messrs. J. C. LEARNED & SON,
New London, or to
B. HAXTUN,
172 Centre st., New York.

### Valuable Property for Sale.

Machine Shop, Foundry, Blacksmith Shop, with Forge Hammer; Saw Mill, Paint Shop, Two Dwelling Houses, with all necessary out-buildings, including 18 acres of land and water right. Situated on Antietam Creek, a never-failing water-power, three miles south of Waynesboro', Franklin Co., Pa. Will be sold on easy terms.
Apply to GARVER, FOLTZ & CO.,
Hagerstown, Md.

### For Sale.

The best Hardware Store in New England, if taken at once. An old-established stand for over forty years. Splendid trade; clean stock of about $25,000. The owner wishes to leave the State.
Address
"EXCELLENT OPENING,"
Office of *The Iron Age*, 83 Reade St., New York.

### Wanted.

Pig Iron Salesman, experienced in the Western trade. A liberal salary given to good man.
Address "PIG IRON, 57,"
Office of *The Iron Age*, 83 Reade st., New York.

### Superintendent Wanted,

to take charge of all departments of an Open Hearth Steel Plant. A rare opening for the right man. Address "STEEL,"
Lock Box 338, Pittsburgh, Pa.

### Wanted.

An Iron and Brass Molder, as partner, with $5000 or more, to start a Foundry with my Machine Shop, at Galveston, Texas. For further particulars, write to
JESSE ASTALL, Proprietor,
West Strand Iron Bolt and Nut Works,
Galveston, Texas.

### Wanted.

An experienced Foreman to take charge of Foundry doing a general Malleable Iron business.
Address "CUPOLA 66,"
Office of *The Iron Age*, 83 Reade st., New York.

### Wanted.

Situation as Manager of Blast Furnace. Have had 20 years' experience. Can give first-class references. Address
"BLAST FURNACE,"
Office of *The Iron Age*, 83 Reade St., New York.

### TO ENGLISH AND CANADIAN MANUFACTURERS.

Wanted.—To arrange with some party to manufacture on royalty, or to buy outright, English Patent No. 4929, for Friction Clutch; also Canadian Patent No. 16,616.

These patents have been thoroughly proved in America, and are recognized as the standard. We are now doing a profitable business of $50,000 per annum. Address D. FRISBIE & CO.,
481 N. 5th st., Phila., Pa.

### Metal Exchange Memberships

Bought and Sold by
WM. WILLIS MERRILL,
4 Stone Street, Room 69.
Dealer in
EXCHANGE MEMBERSHIPS.

### CORRESPONDENCE SOLICITED

from parties intending to purchase Steam Rivetters, Steam Hammers, Hydraulic Presses, Heavy Punch and Shears, &c., &c.

Estimates given for good work very low.
CONTINENTAL IRON WORKS,
Cor. 22d, St. and Washington Ave.,
Philadelphia.

WANTED—By a man, a position as Salesman (in store) in the Hardware and House Furnishing business. Well posted in this business and a first-class salesman. Best of references can be given.
Address "MORREL,"
Care of A. A. MEIMICH, Elkhart, Ind.

## Special Notices.

### SECOND-HAND AND NEW MACHINERY.

**July 19.**

One Corliss Beam Condensing Engine, 30 in. x 72 in.
One Horizontal Corliss Engine, 16 in. x 42 in.
One Horizontal Corliss Engine, 14 in. x 30 in.
One Horizontal Corliss Engine, 12 in. x 30 in.
One Horizontal Corliss Engine, 10 in. x 22 in.
One Horizontal Engine, 12 in. x 24 in.
One Horizontal Engine, 12 in. x 16 in.
One Horizontal Engine, 11 in. x 24 in.
One Horizontal Engine, 9 in. x 16 in.
One Horizontal Engine, 8 in. x 16 in.
One Horizontal Engine, 8 in. x 12 in.
One Hor. Tub. Boiler, 6 ft. x 14 ft.
One Hor. Tub. Boiler, 4½ ft. x 13½ ft.
One Hor. Tub. Boiler, 3½ ft. x 14 ft.
One Locomotive Boiler, 100 H. P.
One Upright Boiler, 30 in. x 8 ft.
One Upright Boiler, 48 in. x 11 ft.
One Portable Engine, 8 in. x 12 in.
One Engine Lathe, 22 in. x 12 ft. New.
One Engine Lathe, 18 in. x 8 ft.
One Engine Lathe, 17 in. x 6 ft. Pond.
One Engine Lathe, 16 in. x 6 ft. Blaisdell.
One Engine Lathe, 13 in. x 5 ft.
One Engine Lathe, 14 in. x 4 ft.
One Engine Lathe, 42 in. x 15 ft.
One Turning Lathe. Very heavy.
One Engine Lathe, 20 in. x 8 ft.
One Planer, 36 in. x 9 ft. 6 in.
One Planer, 34 in. x 6 ft. Novelty.
One Planer, 22 in. x 5 ft. Fitchburgh
One Crank Planer, 24 in. x 5 ft.
One Slotting Machine, 44 in.
One Large Upright Drill, 60 in.
One Large Upright Drill, 24 in.
One Triple-Geared Drill, 48 in.
One Upright Drill, 40 in.
One Upright Drill, 36 in.
One Ames 4-Spindle Drill.
One Milling Machine. Wood & Light.
Two Gear Cutters. Pratt & Whitney.
One Davidson Pump, No. 4. New.
One Dean Steam Pump, No. 3½. New.
One 10 H. P. N. Y. Safety Co.'s Engine and Boiler.
One Portable Boiler, 25 H. P.
One Locomotive Boiler, 3 ft. x 12 ft.

J. Gray's Machinery Depot, 37 Dey St., N. Y.

### Executors' Sale.

PHILADELPHIA HYDRAULIC WORKS.

The Executors of the Estate of Isaac S. Waterman, deceased, offer for sale the Stock, Tools and Fixtures of the Philadelphia Hydraulic Works, together with the property n. e. cor. Washington ave. and 21st st. Lot, 125 x 200 feet. The works are running full time on orders.

For terms, &c., apply at No. 407 Library St.

### For Sale—Lathes and Machinery.

15 in. x 6 ft. second-hand Engine Lathe, $175; 15 in. x 6 ft. Lathe, used two months, $200; 16 in. x 6 ft. new first-class Lathe, $275; 18 in. x 7 ft. new first-class Lathe, $330; 21 in. x 12 ft. new first-class Lathe, $500; Drill, and Lathe Chucks for same, very low. 20 in. Drill Press, new design, $100; 28 in. Back-geared Drill Press, new, $210; Planers, Planer Chucks, Hand and Power Presses, Nut Tappers, Bolt Cutters, Headers, &c. S. M. YORK,
Cleveland, Ohio.

### SCHOOL OF ENGINEERING,

**Vanderbilt University.**
NASHVILLE, TENN.

TUITION, $65 PER ANNUM.

Thorough Courses in

**CIVIL ENGINEERING,**
**MECHANICAL ENGINEERING,**
**MINING ENGINEERING.**

Extensive equipments and practice in drawing rooms, computing room, model room, machine shops and field work.

Free instruction to mechanics and apprentices in mathematics, mechanics and mechanical drawing. Session opens September 1st, 1883.

Send for circulars and detailed information to
J. M. LEECH-BURSAR.

### Proposals for Cast Iron Water Pipes and Special Castings.

OFFICE OF THE WASHINGTON AQUEDUCT,
WASHINGTON, D. C., August 8, 1883.

SEALED PROPOSALS, in triplicate, will be received at this office until 12 o'clock, noon, on Tuesday, September 4th, 1883, for furnishing Three Thousand (3000) Tons, more or less, of Cast Iron Water Pipes and Special Castings for same. The Iron Pipe will include:

680 lineal feet, 75 inches internal diameter; 6700 lineal feet, 48 inches internal diameter; 1060 lineal feet, 12 inches internal diameter; 2650 lineal feet, 8 inches internal diameter; 420 lineal feet, 6 inches internal diameter.

For specifications, blanks on which bids must be made, and all other information, apply at this office. G. J. LYDECKER,
Major of Eng'rs, U. S. Army.

### New Inventions.

Patentees desirous of introducing their inventions

**Into the English Market,**

are requested to address their circulars, with full particulars, prices and best discounts, to

**S. & E. RANSOME & CO.,**
*10 Essex St., Strand, London, Eng.*

Wholesale Merchants and Factors for Engineers' and Ironmongers' Goods.)

NOTE.—All quotations must include free delivery to London or Liverpool.

### E. BISSELL & CO.,

**Wholesale Hardware Auctioneers,**
*83 Chambers and 65 Reade Sts., N. Y.*

Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

### Wanted.

HEAVY CASTINGS AND ROLLS.

Wanted to buy Old Heavy Castings and Rolls of all kinds. Address
MATTHEW GILL, Jr., & CO.,
1240 N. 9th St. (below Thompson St.) Philadelphia.

### THE VICTOR HEATING CO.,

of NORWICH, Conn., manufacture the
CHEAPEST AND BEST STEAM HEATER
on the market. A responsible party familiar with Steam Heating wanted in each large town to sell and put up the Heaters. **Send for Circular.**

### Notice.

I will sell 200 Shares Stock of the Chicago Tire and Spring Works, or any part of the 200 Shares, to the highest bidder; Shares, $120 each. This is the best paying stock in Illinois. No reasonable offer refused, and warranted genuine.
Address LESLIE IRON WORKS,
Jersey City, N. J.

### WANTED.

A Shipping Clerk for a mill rolling shape iron. Must be active and industrious, and understand the business. Address "A. A. A.,"
Office of *The Iron Age*, 83 Reade St., New York.

## Special Notices.

### NEW AND SECOND-HAND MACHINERY.

1 Engine Lathe, 39 in. swing, 18 ft. bed. 2d hand.
1 Engine Lathe, 36 in. swing, 20 ft. bed. New.
1 Engine Lathe, 34 in. swing, 17 ft. bed. New.
1 Engine Lathe, 34 in swing, 9 ft. bed. New.
1 Screw-cutting Gap Lathe, 26 in. swing over bed, 48 in. swing over gap; bed 24 ft. long. New.
1 each Engine Lathes 26 in. swing, 10 ft., 12 ft., 14 ft., 16 ft., 20 ft., 24 ft. bed. New.
2 Engine Lathes, 24 in. swing, 9 ft. bed. New.
1 Engine Lathe, 23 in. swing, 16 ft. bed. 2d hand.
1 each Engine Lathes, 21 in. swing, 6 ft., 8 ft., 10 ft., 12 ft. bed. New
1 each Engine Lathes, 20 in. swing, 6 ft., 8 ft, 10 ft., 12 ft. bed. New.
1 Engine Lathe, 20 in. swing, 8 ft. bed. 2d hand
1 each Engine Lathes, 19 in. swing, 7 ft, 8 ft, 10 ft. bed. New.
4 Engine Lathes, 19 in. swing, 6 ft. bed. Nearly new
1 each Engine Lathes, 17 in. swing, 6 ft., 7 ft., 8 ft., 10 ft. bed. New.
1 Engine Lathe, 16 in. x 7 ft. bed. 2d hand.
1 Engine Lathe, 15 in. swing, 9 ft. bed. 2d hand.
2 " 15 " " 6 " " New.
1 " 14 " " 6 " " 2d hand.
1 " 13 " " 6 " " New.
3 " 13 " " 5 " " "
1 " 12 " " 5 " " "
1 " 11 " " 5 " " "
1 " 10 " " 4 " " "
2 Hand Lathes, 15 in. x 5 ft. bed. New.
2 " 12 in. x 4 ft. bed. 2d hand.
1 " 12 in. x 4½ ft. bed. New.
1 " 12 in. x 4 ft. bed. New.
1 " 11½ in. x 4 ft. bed. New.
1 " 11 in. x 5 ft. bed. Backgeared. 2d hand.
1 " 10 in. x 3½ bed. 2d hand.
1 " 10 in. x 2 ft. New.
6 " 10½ in. sw., 3 x 4 ft. bed. 2d hd
5 Single Head Lathes, 13 " 4 ft. " "
1 Bench Lathe, 8½ in. x 3 ft. bed. New.
1 Foot Lathe, 8½ in. x 3 ft bed. New.
1 Foot Lathe, 12 in. x 4 ft. bed. New.
1 Foot Lathe, 8 in. x 3 ft. bed. Back-geared.
1 Foot Lathe, 8 in. x 2 ft. 8 i bed. New.
1 Turret Lathe. 2d hand. 16 in. x 5 ft. bed. With Chuck.
1 Axle Lathe. New.
1 Planer to plane 31 in. x 30 in x 6 ft. 2d hand.
1 Planer to plane 34 in. x 32 in. x 12 ft. 2d hand.
1 Planer to plane 27 in. x 27 in. x 7 ft. New.
1 Planer to plane 24 in. x 24 in. x 8 ft. New.
1 Planer to plane 24 in. x 24 in. x 6 ft. New.
1 Planer to plane 24 in. x 24 in. x 5 ft. New.
1 Planer to plane 22 in. x 22 in. x 5 ft. New.
1 Planer to plane 20 in. x 20 in. x 4 ft. New.
1 Planer 20 in. x 4½ ft. 2d hand.
2 Planers to plane 16 in. x 16 in. x 3 ft. New.
3 Crank Planers. New.
2 Shapers, 15-in. stroke, 23-in. traverse. New.
1 Shaper, 8 in. stroke. New.
1 Shaper, 6 in. stroke. New.
1 Shaper, 12-in. stroke, 33-in. traverse. New.
1 Shaper, 12-in. stroke, 18-in. traverse. New.
2 Shaping Machines, 7-in. stroke. 2d hand.
1 Back-geared Milling Machine. New.
1 Milling Machine, with Arm. New.
1 Lincoln Miller. New.
1 Hand Milling Machine. New.
1 Miller and Screw Slotter, combined.
1 Double Face Miller. New.
1 Automatic Milling Machine. New.
1 40-in. Radial Drill. New.
1 48 in. " "
1 42-in. swing Uprigh Drill, B. G. & S. F. New.
3 24-inch Up. Drills, Bk. Gr. and Self Feed. New.
1 20-inch Lever Feed Upright Drill. New.
1 20-inch Lever and Wheel Feed Upright Drill. New.
1 Sensitive Drill New.
1 Pratt & Whitney 4-Spindle Drill. 2d hand.
1 Garvin's 4 Spindle Drill. 2d hand.
1 4-Spindle Drill Press. New.
1 3 " " " "
1 2 " " " "
2 Gang or Multiple Drills, 3 and 6 spindles. 2d hand.
1 Single Spindle Light Drill, Table Feed. New.
1 Single Spindle Profiler. New.
1 Two " " Light. New.
2 Profilers. 2d hand.
2 Turret Head Chucking Machines. 2d hand.
1 No. 1 Screw Machine, wire feed. 2d hand.
1 No. 2 Screw Machine, wire feed. New.
1 Screw Machine. New. Not wire feed.
1 " Slotter. "
1 Cutter Grinder. "
6 Emery Grinders. New.
1 Slitting or Circular Shear. New.
2 Tapping Machines.
1 Upright Bor. and Turn. Mill, 10 ft 4 in. swing. 2d h.
1 12-in. Slotting Machine, 50-in. swing. New.
1 8-in. " " 36-in. swing. New.
1 Hydraulic Wheel Press for 72-in. Wheels. New.
1 13 ft. Bending Rolls. 2d hand.
1 Squaring Shear, 22 in. New.
3 Hand Shears. 2d hand.
3 Power Presses. New.
1 Foot Press. New.
1 Screw Press. New.
1 Drop Press. New.
1 Drop Press, 50 lb. Hammer. 2d hand.
1 Hand Lever Punch. 2d hand.
1 Lot Heavy Foliating Frames 2d hand.
2 Shafting Straighteners. New.
1 8 x 8 Upright Engine. New.
1 10 x 12 Horizontal Stationary Engine. New.
1 9½ x 12 in. Horizontal Stationary Engine. New.
1 5 in. x 6 in. Horizontal Stationary Engine. New.
1 5 x 12 Horizontal Stationary Engine. 2d hand.
1 10 H. P. Cylinder Boiler. 2d hand.
1 10 H. P. Upright Boiler. New.
1 10 H. P. Upright Boiler. 2d hand.
1 No. 1 Steam Pump. 2d hand.
2 Grindstones and Frames. New.
1 48 in. Blacksmith Forge. 2d hand.
1 Lot 15 in. Smoke-stacks. 2d hand.

**Wood-Working Machinery.**

1 Saw Table. New.
1 Double Saw Bench. New.
1 24-in. Surfacer Rotary Bed. New.
1 Band Sawing Machine. New.
1 Scroll " "
1 Rod Machine. Self Feed. "
1 Sandpapering Machine. 2d hand.
1 8-in. Molder, 4 sides. 2d hand.
1 Edge Molding Machine. 2d hand.
1 Large Lot 2d-hand Pulleys and Hangers. And lot of others, both new and 2d hand.

*If the list does not contain what you want, write us.*

**J. M. BADGER & CO.,**
**49 DEY STREET, New York City.**

### For Sale.

THE WHOLESALE AND RETAIL

### HARDWARE AND STOVE BUSINESS OF F. J. HOGAN & CO.,

**Little Rock, Ark.**

LONG ESTABLISHED. A CLEAN STOCK OF ABOUT $20,000. SATISFACTORY REASONS FOR SELLING.

### SCREW CUTTING LATHE,

32 in. x 21 ft.; Planer, 32 in. x 7 ft.; large Upright Drill, Tools and other Machinery, second-hand, for sale low by A. FURVES & SON,
South and Penn sts., Philadelphia.

### Special Notice.

A Pocket Manual for Engineers. Edited by John W. Hill, M. E. Edition, 10,000. Printed from Electrotype Plates on White No. 1 Book Paper. One half stiff Morocco Covers; one-half Cloth, with Cardinal Edges. Will be distributed, postage prepaid, on receipt of $1.25 each.

A pocket manual of useful information for Mechanical Engineers, Steam Users and Mechanics, containing 224 pages (size 4 Nonpareil type) of carefully selected data, formulæ and experimental investigations from the latest and most approved sources. Published by WM. A. HARRIS, builder of Harris-Corliss Steam Engines, Providence, R. I., to whom all subscriptions for copies should be sent.

## Special Notices.

### New & Second-Hand Machinery.

**FEB. 21, 1883.**

1 Engine Lathe, 14 in. x 5, 6, 7 and 8 ft Grant & Bogert.
1 " " 26 in. x 12 ft., Grant & Bogert. New.
1 " " 46 in. x 16 ft. Good order.
1 " " 36 in x 12 17 ft. New.
1 " " 42 in. x 14 ft. New.
1 " " 13 in. x 6 ft. Star Tool Co. New.
1 " " 16 in. x 6 ft. New.
1 " " 14 in. x 5 x 6 ft. New.
1 " " 16 in. x 7 ft. Bridgeport. New.
1 " " 13 in. x 5 ft. and 6 ft. Ames. New.
1 " " 16 in. x 6, 7 and 8 ft. Ames. New.
1 " " 18 in. x 8 and 10 ft. Lodge & Barker. New
1 " " 27 in. x 10 in. Lodge & Barker
1 " " 22 in. x 12 ft. New.
1 " " 20 in. x 10 ft. New.
1 " " 28 in. x 16 ft. New.
1 " " 24 in. x 12, 14 and 16 ft. New.
1 " " 11 in. x 4 ft. and 5 ft. Prentiss. New
1 " " 12 in. x 5 ft. Young. New.
1 Plain Engine Lathe, 16 in. x 4 ft. New.
1 " " " 15 in. x 4 ft. New.
1 Fox Lathe, 15 in. x 5 ft. Am. Tool & Machine Co.
1 15 in. x 4 ft. Turret Lathe. Lodge & Barker.
1 Fox Turret Lathe, 16 in. x 6 ft. Lodge & Barker. New
1 Planer, 60 in. x 60 in. x 17 ft Good order.
1 " 32 in. x 32 in. x 7 ft. Good order.
1 " 16 in. x 16 in. x 3 ft. New.
1 " 22 in. x 20 in. x 5 ft. New.
1 " 24 in. x 24 in. x 6 ft. Hendey. New
1 " 26 in. x 26 in. x 7 ft. New.
1 " 16 in. Lever Table Drill. New.
1 Crank Planer, 16 in. x 16 in. x 13 in. New.
1 16-in. Upright Drill. New.
1 20-in. " Prentiss. New.
1 24-in. " Prentiss. New.
1 30 in. " Prentiss. New.
1 25-in. swing B. G. & S. F. Drill. Blaisdell. New
1 28-in. " " " "
1 38 in. swing, B. G. & T. F. Drill. New.
1 15-in. Shaper. Gould & Eberhardt. New.
1 10-in. Shaper. Gould & Eberhardt. New.
1 15-in. Shaper. Hendey. New.
1 24 in. Shaper. Hendey. New.
1 24-in. Shaper. Hendey. Good order.
1 9-in. Shaper. Hewes & Phillips. New.
1 9-in. Shaper. New.
1 14-in. Shaper.
Full Assortment of Milling Machines, Spindle Drills, &c., of Garvin's. New. J. & Lamson.
1 each Nos. 2 and 4 Screw Machines, Wire Feed. Jones
2 No. 2 Lincoln Millers. Good order.
2 No. 2 Lincoln Millers. New.
1 Hand Lathe, 12 x 4, 5 and 6 ft. New.
1 Hand Lathe, 16 in. x 6 and 7 ft. New.
1 Boring and Turning Mill, 50 in. New.
1 Boring and Turning Mill, 72 in., 2 Heads. New.
1 each 3 and 7 spindle Nut Tappers. New.
1 Gig Saw. Good as new. Rogers.
1 700-lb. Steam Hammer. Ferris & Miles. Good order

New York Agency of
THE TANITE CO. and GRANT & BOGERT MACHINE TOOL WORKS,
**H. PRENTISS & CO., 42 Dey St., N.Y.**

### For Sale.

Established 1873. Gardner Bros "Standard Savage" Fire Brick Works, situated at Ellerslie Station, Md., on Baltimore and Ohio R. R. Also on Bedford Branch of P. R. R. Has convenient shipping arrangements on both roads. Works consist of two independent plants of machinery, so constructed and arranged that they can be run separately or together. One of the buildings entirely new, erected last year. Capacity of works, over 14,000 bricks per day. Mount Savage clay in abundance, mined on royalty, and delivered direct into works by gravity. Inclined plane and tram road, large portion of which was laid with new Tee rail last year. New artesian well, capacity over 35 barrels per hour. Also mountain stream, delivering water by gravity into tanks at works. Seven acres of land, with nine good tenements. Everything in first-class order for manufacturing and shipping brick direct from kilns into cars. Good and growing trade established. Brick unquestionably as good as the best made of Mount Savage clay. Statements of business done will be shown to responsible parties desirous of purchasing. Our good will and influence to go with sale. Any further information desired will be cheerfully given by

GARDNER BROS.,
Lockport, Pa.

### For Sale.

Established in 1864. Gardner Bros.' Gas Retort and Fire Brick Works, situated at Lockport Station, on P. R. R., 60 miles from Pittsburgh, Pa. The works consist of complete plant for manufacturing Clay Gas Retorts, Settings, Blocks, Tile and Fire Brick. Capacity, about 100 retorts, with necessary settings, and 100,000 fire brick per month. Clay and coal mined by ourselves within short distance of works and hauled in wagons. Over three acres of land, with all necessary buildings, a number of tenements and town lots. P. R. R. has side track alongside our kilns. Good trade established. Our good will and influence to go with sale. Statement of business done will be shown to responsible parties desirous of purchasing. Any further information desired will be cheerfully given by

GARDNER BROS.,
Lockport, Pa.

### For Sale.

The Industrial Works of Shamokin, owned and successfully carried on for a number of years by the late Wm. Brown, deceased, consisting of Foundry and Machine Shop, and a large stock of Patterns regarded as part of the property. Boiler Shop, Blacksmith Shop and Factory for the manufacture of heavy coal screens. Well located in the borough of Shamokin, Pa., with the best facilities for shipping by rail, and surrounded by a district contributing all the work that a shop of that kind can possibly turn out. Easy terms of payment are offered to suit a purchaser of limited capital. For list of Tools and further particulars apply to
WM. McILVAIN & SONS,
Manufacturers of Boiler Plate and Tank Iron,
Reading, Pa.

### For Sale

AT A BARGAIN,

in one of the pleasantest cities of Eastern Massachusetts, not 12 miles from Boston, a Hardware business, established twenty years and the best stocked store in the vicinity.
Address L. B. J.,
Office of *The Iron Age*, 83 Reade st., New York.

### For Sale.

Stock of Hardware, Stoves and Tinware, in one of the best towns in Southern Minnesota; population about 3000, and growing rapidly. Nice clean stock; will inventory about $6000; satisfactory reasons for selling. Address
W. B. RUMSEY,
Albert Lea, Minn.

### For Sale.

Foundry situated at 2028 N. 10th St., Philadelphia. In good running order. 147 feet front on 10th St. and 120 feet back on Alter St. Room for fifteen moulders. Plenty of work, good locality and good customers. For further particulars, address
WM. FLESH, 2028 N. 10th St.,
Philadelphia, Pa.
Reason for selling out, retiring from business.

### For Sale.

One Granulator, with attachments.
One large Mixer, with attachments.
One No. 5 Vacuum Pump.
Two Sugar Packers.
The above is a portion of the Machinery formerly used at Baltimore Steam Sugar Refinery, Baltimore, Md. For information apply to
GEO. B. GRAHAM,
P. O. Box 689, Baltimore, Md.

### For Sale.

One 600 lb. Davy Bros.' Steam Hammer; one 1500 lb. Morgan, Williams & Co.'s Double Standard Steam Hammer; one Heavy Wood Frame Trip Hammer; one 10 H.-P. Side Feed Cut-off Engine; two 60 H.-P. Tubular Boilers, with No. 3½ Deane Steam Pump, and all connections. Mud Drums, &c. Have not been used to exceed 90 days—practically new. Also a general assortment of new and second-hand Engines, Boilers and Machinery. Cheap for Cash.
M. F. PERRY,
43 South Canal Street, Chicago, Ill.

## Special Notices.

### For Sale or Lease.

A Large Two-Story Brick Factory,

formerly Machine Works, at Pearl River, N. Y., on railroad depot, 25 miles from New York City, Railroad facilities unexceptionable, on the line of the New Jersey and New York Railroad. The property contains 40,000 square feet floor space, with one 80 H. P. Engine and Boiler, 700 ft. 2-inch line shafting and pulleys, main belts, steam heating and water pipes throughout the building. A splendid iron foundry, 70 ft. by 90 ft., with one iron smelting cupola with Mackenzie blower, brass furnace, core oven, blacksmith shop, pattern vaults, annealing oven, etc. The property can be bought or leased on liberal terms. For further particulars, price, terms, etc., address

J. E. B. & Co.,
113 Liberty st., New York City,
or Pearl River, Rockland Co., N. Y.

### For Sale.

The largest stock of New and Second-hand Engines, Boilers, and general Machinery in the West. Send for Catalogue. Hoisting Outfits for Coal Mining and other purposes a specialty.

WARREN SPRINGER,
195 to 219 South Canal St., Chicago.

### For Sale.

Second-hand

DROPS and LIFTERS.

BEECHER & PECK,
Lock Box 222, New Haven, Conn.

### STEAM PUMPS For Sale.

A large number of Steam Pumps of all makes, and ranging in size from small tank or boiler feeds up to very heavy service machines.

While the stock lasts good bargains are open for Miners, Water Works, Rolling Mills, Furnaces, or any one needing to move fluids by steam.

Call upon or address

JNO. A. HINCKLEY,
Purchasing Agent of the United Pipe Lines,
Oil City, Pa.

### For Sale.

MACHINES FOR MAKING PICKS, MATTOCKS AND AXES,

With **Solid Punched** or **Adze Eyes.**

T. & CO., Box 25,

Office of *The Iron Age*, 83 Reade st., New York.

### For Sale.

TREBLE AND DOUBLE-GEARED 25-INCH ENGINE LATHES,

from new patterns.

GEORGE A. OHL & CO.,
East Newark, N. J.

### FOR SALE.

The extensive Foundry and Machine Shops formerly owned by Clute Bros., adjoining the Erie Canal, and at the junction of the several railroads centering here, are offered for sale on reasonable terms. On the premises are Engine, Boiler, Cupola, Line Shafting, Steam Heating Pipes, Cranes, Dormant Scales, &c. For further information, address,

H. S EDWARDS,
For Mohawk National Bank.

SCHENECTADY, July 24, 1883.

### For Sale.

The half interest in a Wholesale and Retail Hardware business in the City of Jacksonville, Florida. Sales last year, $250,000. Inquire of Holbrook Bros., 87 Beekman St., New York City; Perry & Co., Albany, N. Y.; McConnell & Co., Hornellsville, N. Y.; and of the proprietors,

BENEDICT & McCONIHE,
Jacksonville, Florida.

### 24-INCH LATHES FOR SALE.

2 24 inch x 9 ft. Lathes.....$400
2 24 inch x 12 ft. Lathes..... 500

First-class, and warranted accurate.

B. GRAVES LOUDEN,
22d st. and Washington ave.,
Philadelphia.

### Wanted.

A Partner with $5000 to $10,000 in a Foundry and Machine Business, established in 1824. For particulars, inquire of

I. H. COLLER,
Poughkeepsie, N. Y.

### To Brass Foundries.

### To Brass Manufacturers.

Our new foot press, for cutting off GATES from brass castings by FOOT power, is now ready. Weight, 250 lbs. Price complete, $50, net. A boy can operate it easily. We warrant them to give the most perfect satisfaction. PEERLESS PUNCH AND SHEAR CO.,
48 W. Dey Street, New York

### CORNELL UNIVERSITY.

COURSES IN

Mechanical Engineering,
Electrical Engineering,
Civil Engineering
and Architecture.

ENTRANCE EXAMINATIONS BEGIN AT 9 A. M., JUNE 18 and SEPT. 18, 1883.

For the UNIVERSITY REGISTER, containing full statements regarding requirements for admission, courses of study, degrees, honors, expenses, free scholarships, etc., and for special information, apply to THE PRESIDENT OF CORNELL UNIVERSITY Ithaca, N. Y.

### VALUABLE PROPERTY FOR SALE.

The Hardware Works, Tenth and Spruce Streets, Reading, Pa., consisting of Foundry, Machine Shops, Warehouse, and other buildings, machinery etc., all in first class running order. One entire block of ground. Ample room for extension. Will be sold on easy terms. Apply to

F. C. SMINK,
Reading, Pa.

### WANTED.

By a man, a position as City Buyer or Salesman (in store) in the Hardware Business. Well posted in General Hardware. Address

Wm. REEVES, 87 Dey St., New York City.

## Special Notices.

NEW AND SECOND-HAND

### MACHINERY.

One Iron Planer, 16 ft. x 60 in.
One Iron Planer, 7 ft. x 32 in.
One Screw-cutting Lathe, 11 ft., 18 in. swing.
One Screw-cutting Lathe, 16 ft, 24 in. swing.
Two Lincoln Milling Machines.
One Smith & Garvin Machine.
One 3-Spindle Upright Drill.
One 25-in. Back-Geared Drill.
Three Edging Machines.
One 12 x 42 in. Corliss Engine.
One 50 H.-P. Return Tubular Boiler.
One 60 H.-P. Locomotive Boiler.
One 8 H.-P. Hoisting Engine and Boiler.
One 26-in. Endless Bed Planer.
One 24-in. Gray & Woods Planer, with Feed Rolls.

HENRY I. SNELL,
135 N. 3d Street, PHILADELPHIA.

### For Sale.

### Palo Alto Rolling Mills,

**Near Pottsville, Pa.,**

ON THE MAIN LINE OF THE POTTSVILLE AND READING RAILROAD.

These mills are in good repair, and can be started in two days' time.

Rolls for T-Rails 12 to 70 lbs. per yard, and for Street Rails 18 to 70 lbs. per yard.

Guide Mill Train for Merchant Iron ¼ to 1 inch.

Rolls for Merchant Bar, round and square, up to 4½ inches.

Number of Puddling Furnaces in both mills, 30; Heating Furnaces, 9; all with boilers attached.

Also Foundry, Machine Shop, Blacksmith Shops, Iron House, Roll House, Carpenter and Pattern Shops, Stables, handsome Dwelling for Superintendent, 11 Tenement Houses, a Brick Office, and ample grounds for stock and cinder.

For further particulars address

Messrs. LEE & McCAMANT, Extrs.,
**Pottsville, Pa.**

THOS. F. WRIGHT, 1804 Race St., Philadelphia, Pa.
HUGH W. ADAMS, 56 Pine St., New York.

### For Sale.

### Bolt and Nut Machinery.

9 Bolt Cutters, National, capacity up to 1 in.
10 Bolt Cutters, National, capacity up to 1¼ in.
6 Bolt Cutters, National, capacity up to 1½ in.
3 Bolt Cutters, National, capacity up to 2 in.
3 Bolt Cutters, National, capacity up to 2½ in.
2 each, 3 in. and 4 in.
2 National Bolt Headers, capacity up to 1 in.
1 National Bolt Header, 1½ in.
1 Improved Lewis Bolt Header, capacity up to 1⅛ in.

Several Chapin Headers, light and heavy: Nut Tappers, a complete assortment; Cold Headers for Rivets, Store Bolts, &c.; Hot-pressed Nut Machines, 3 sizes; Washer Machinery, and every variety of tool used in Bolt and Nut Shops. The only specialists in line in the United States.

Address
THE NATIONAL MACHINERY CO.,
Tiffin, O.

Catalogues sent free to any address.

### For Sale.

1 Train, Lauth 8, 3-high rolls, 22-inch.
1 Train, 2-high rolls, 22-inch.
1 Train, 2-high soft rolls, 20-inch.
1 Train, compound, 2-high muck rolls, 18-inch.
1 Roll-Turning Lathe.
1 Large Engine, 22 in. x 32 in.
4 Large Boilers, fire-box 28 ft. x 48 in. Good as new.
4 Medium Boilers, 24 ft. x 42 in.
1 Large Squeezer, 1 Large Pump, 1 Plate Shear, 1 Sheet Shear, 1 Muck Shear, 2 Scrap Shears, Castings for four Charcoal Fires, Fans, Tools, Patterns, Scales, &c.

Will be sold together, or separate, very cheap. Easy terms to responsible parties.

Address, **H. W. W.,**
130 Dearborn St., Rooms 14 and 16,
Chicago, Ill.

### Travelers Wanted

One or two men of experience in the Heavy Hardware and Ship Chandler, business. Good references required. Address

HARDWARE, 69,
Office of *The Iron Age*, 83 Reade st., New York.

### CORRESPONDENCE IS SOLICITED

with parties having

### MACHINERY TO BUILD,

Heavy work preferred.

Address
THE HARTFORD ENGINEERING CO.,
Hartford, Conn.

### Manufacturers

desiring to locate where they will have cheap fuel and building material, superior shipping facilities by rail and river, affording direct communication with the rapidly growing States and Territories, combined with good social and healthful advantages, will find it to their interest to correspond with

J. W. STEWART,
President Business Men's Ass'n,
Rock Island, Ill.

### Wanted.

Cotton Bale Hoop Cuttings, Oily Wrought Iron Trimmings, Cast Iron Borings, No. 1 Wrought Scrap Iron. Address (naming price and point of delivery),

JOS. J. LIPPINCOTT & CO.,
131 So. Fourth St., Philadelphia, Pa.

### Southern Mineral Lands.

Rock City Real Estate Association is a chartered company composed of men of wealth and character in Tennessee. J. M. Hamilton, President; Ira P. Jones, Secretary and Treasurer; Henry E. Colton, late Geologist and Inspector of Mines for the State, is General Manager and Geologist. Have now for sale lands in Tennessee containing red fossil and brown hematite iron ore; coking and domestic coal in Tennessee and Alabama; gold, silver, copper and magnetic iron ore in North Carolina; manganese and zinc ore in Arkansas. Also timber and tan-bark lands.

Careful examinations and reports made of lands in any of the Southern States. Examination of titles made and abstracts furnished.

Address HENRY E. COLTON, Gen'l Mngr.,
Nashville, Tenn.

WANTED.—A Salesman for Pennsylvania; also one for the Eastern States. Must be familiar with Cutlery and kindred branches. Address, giving references, age and salary required,

"CUTLERY,"
Office of *The Iron Age*, 83 Reade St., New York.

## Special Notices.

Newand Second-hand Iron Working

### MACHINERY.

Two Engine Lathes, 42 in. x 16 ft. Triple Geared. Ames. New. August.
One Engine Lathe, 36 in. x 18 ft. Fifield. New. Aug. 1.
One Engine Lathe, 30 in. x 18 ft. Ames. New.
One Engine Lathe, 24in.x10ft.-12ft.-14ft. and 20 ft. New. Ames.
One Engine Lathe, 24 in. x 12 ft. Fifield.
One Engine Lathe, 20 in. x 12 ft. Ames. New.
One Engine Lathe, 20 in. x 10 ft. Ames. New.
One Engine Lathe, 20 in. x 8 ft. Ames. New.
One Engine Lathe, 16 in. x 6-7-8 ft. Bridgeport Mch. Tool Works. New.
Six Engine Lathes, 16 in. x 6 ft. 7 ft. x 8 ft. Ames. New.
Six Engine Lathes, 13 in. x 6 ft. Ames. New.
Two Engine Lathes, 13 ft. x 5 ft. Ames. New.
Six Hand Lathes, 12 in. x 5 ft. Hendey. New.
One Chucking Lathe, 20 in. x 5 ft. New.
Two Pulley Turning Machine, 26 in. & 36 in. New.
One Planer, 16 in. x 3 ft. Bridgeport. New.
One Planer, 20 in. x 4½ ft. Phœnix. A1.
One Planer, 20 in. x 5 ft. Hendey. A1.
One Planer, 26 in. x 7 ft. Brettel. New.
One Planer, 24 in. x 6 ft. 7 ft. and 8 ft. Ames. New.
One Planer, 27 in. x 6-7-8 ft. Ames. New.
One 6 in. Stroke Shaper. Boynton. New.
Two 9 in. Stroke Shapers. Hewes & Phillips.
One 14 in. Stroke Shaper. Hendey. New.
One 15 in. Stroke Shaper. G. & E. New.
One 24 in. Stroke Shaper. Hendey. New.
One Screw Machine. No. 2. P. & W. A1.
One Screw Machine. No. 3. P. & W. A1.
One Screw Machine. New Pattern Wire Feed. Secor.
Three 4 Spindle Drills. No. 2. Pratt & Whitney A1.
One 6 Spindle Drill. No. 1. Pratt & Whitney.
One 20 in. Upright Drill. Prentice. New.
Two 22 in. Upright Drills. Prentice. New.
One 26 in. Upright Drill. Prentice. New.
One 30 in. Upright Drill. Prentice. New.
Three Sensitive Drills.
13 Lincoln Millers and Vises. Good order.
One 10 lb. Air Hammer. Hotchkiss. Good order.
One 200 lb. Bradley Hammer. A1.
All sizes Bradley Hammers furnished to order promptly.

**New York Agency Brown & Sharpe Co.'s Machinery.**

E. P. BULLARD, 14 Dey St., New York.

GENERAL EASTERN AGENT FOR

Akron Iron Co.'s Patent Hot Polished Shafting.

### LIST OF NEW MACHINERY FOR SALE.

1 Engine Lathe, 20 ft. bed, 42 in. swing.
1 " 18 " 36 "
1 " each 14, 16 and 18 ft. bed, 30 in. swing.
1 " each 10 and 12 ft. bed, 27 in. swing.
1 " each 8, 10 and 12 ft. bed, 23 in. swing.
1 " each 8, 10 and 12 ft. bed, 19 in. swing.
1 " 8 ft. bed, 18 in. swing.
1 " each 6 and 8 ft. bed, 16 in. swing.
1 " 6 ft. bed, 15 in. swing.
1 " 5 " 11 "
2 Iron Planers, to plane 10 ft., 30 x 30 in.
2 " to plane 7 ft., 26 x 26 in.
2 " to plane 4 ft., 22 x 22 in.
1 each 22, 24, 26, 30 and 38 in. swing B. G. S. F. Upright Iron Drills.
1 Shaper, each 10 and 15 in. stroke.
2 Shapers each 12 in stroke.
2 Bolt Cutters, to cut 1½ and 2 in.

Send for lists of new and second-hand Tools.

**The Geo. Place Machinery Company,**
No. 121 Chambers and 103 Reade Sts., New York.

### For Sale.

Having decided to enter largely into the manufacture of the Allen Hay Tedder, recently patented by myself, I will sell out my prosperous and successful

AGRICULTURAL IMPLEMENT, HARDWARE, STOVE AND TIN BUSINESS,

ESTABLISHED HERE IN 1863. Stock good, clean and new. Also three-story Brick Building, Warehouse and Sheds; or will rent buildings at reasonable figures. For full particulars, parties meaning business please call on or address

P. A. SPICER,
117 State Street, Marshall, Mich.

### SALE of MACHINERY by AUCTION.

I will sell at auction, at Ayer Junction, Mass., Tuesday, September 4, A. M., a large lot of Gun and Pistol Machinery, all of first-class manufactures and nearly new, consisting in part of Milling, Reaming, Profiling, Sizing, Rifling, Tapping, Boring, Sawing Machines, &c., &c.

Also, several new Engine Lathes, Drill Presses and other Machine Tools, one Hot Iron Sawing Machine, one Slitting Machine and one heavy Slotting Machine. Presses, &c.

Sale positive, to close an account. Send for catalogue. Address M. RYNN,
Ayer Junction, Mass.

### Patent Interest for Sale.

A new Self-Locking Last-Fastener. Nothing like it in the market. A good opportunity for a good, energetic man who is well versed in the Hardware trade. Would also like a good Manufacturing Co. to take hold of it to manufacture it on Royalty.

For further particulars inquire of

HENRY BAUSCH,
P. O. Box 354, Rochester, N. Y.

### Hardware.

An excellent opportunity to engage in the wholesale trade for one who can command $25,000, or would like to join hands with a good live concern in the South or Northwest, and put in as capital the stock, which is in excellent condition and well assorted.

Address "C. W. C."
Office of *The Iron Age*, 36 and 38 Clark St., Chicago, Ill.

### For Immediate Delivery.

600 TONS BLACK SHEET IRON,
Assorted Gauges.
2000 TONS ASSORTED BARS, BANDS & HOOPS.
Write for particulars.

PACKARD, SMITH & CO.,
Warren, Ohio.

MACHINERY for cotton mills, saw mills and turpentine distilleries wanted in exchange for Mississippi yellow pine, ash, oak, poplar and hickory timber lands, convenient to shipping.

FARMERS' LAND CO.,
25 State st, New York.

THE Advertiser, residing in Toronto, Canada, wishes to obtain importers' or manufacturers' samples on commission; has a large connection and sample room in good position. The best of references. Specialties preferred. Apply BOX 15, Office of *The Iron Age*, 83 Reade street, New York

A PRACTICAL Roller of 12 years' experience is open for engagement. Either Bar or Guide Mills. Strictly temperate habits, and can produce first-class references.

Address "ROLLER, 42,"
Office of *The Iron Age*, 83 Reade st., New York.

HARDWARE.—A trustworthy, energetic and hard-working young man of good address and habits, thorough knowledge of and influence with the Hardware trade in Texas, desires to represent a first-class concern. References A No. 1.

Address, "B. K.," Post Office, Dallas, Tex.

WANTED.—An experienced Chemist, thoroughly familiar with Steel making and management of Blast Furnaces also Charcoal Blast Furnaces, &c., is open for engagement. Situation as Chem st, Superintendent or Assistant Superintendent preferred. High references from present employers.

Address "STEEL WORKS CHEMIST, 39,"
Office of *The Iron Age*, 83 Reade St., New York.


# Trade Report.

## BRITISH IRON AND METAL MARKETS.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, Aug. 29, 1883.

**Scotch Pig.**—The market continues dull, with no change to note in quotations. Makers' brands are quoted as follows:

| | | | |
|---|---|---|---|
| Coltness, | alongside, | Glasgow | 60/ |
| Langloan, | " | " | 59/ |
| Gartsherrie, | " | " | 56/6 |
| Summerlee, | " | " | 57/ |
| Carnbroe, | " | " | 55/ |
| Glengarnock, | " | Ardrossan | 55/ |
| Eglinton, | " | " | 49/ |
| Dalmellington, | " | " | 49/ |
| Shotts, | " | at Leith | 59/6 |

Lighterage from Ardrossan to Glasgow is 1/ ₱ ton.

**Cleveland Pig**—Is a little steadier; quotations are unchanged. We quote as follows, f.o.b. shipping ports:

| | | |
|---|---|---|
| Middlesboro' | No. 1 Foundry | 43/6 |
| " | No. 2 " | 41/6 |
| " | No. 3 " | 39/ @ 39/6 |
| " | No. 4 Forge | 38/ |

**Bessemer Pig.**—The market continues dull and weak, with no change in quotations. W. C. Hematites are quoted 49/ @ 50/ for mixed lots, Nos. 1, 2 and 3, f.o.b. shipping ports.

**Blooms.**—Nothing doing.

**Manufactured Iron.**—The market continues irregular. We quote at works:

| | | £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|---|
| Staff. Ord. Marked Bars | | 7 | 10 | 0 | @ | ..... | | |
| " | Medium " | 6 | 5 | 0 | @ | 6 | 15 | 0 |
| " | Common " | 6 | 0 | 0 | @ | 6 | 5 | 0 |
| Hoops, 20 W. G. and over. | | | | | | | | |
| " | Common Best | 7 | 0 | 0 | @ | 7 | 5 | 0 |
| " | Medium | 6 | 5 | 0 | @ | 6 | 15 | 0 |
| " | Common | 6 | 10 | 0 | @ | ..... | | |
| Sheets, 20 W. G. and under. | | | | | | | | |
| " | Ordinary Best | 8 | 15 | 0 | @ | 9 | 5 | 0 |
| " | Common | 8 | 0 | 0 | @ | 8 | 5 | 0 |
| Welsh Bars | | 5 | 5 | 0 | @ | 5 | 7 | 6 |

**Steel Rails**—Are irregular, with light demand. Ordinary Sections are quoted £4. 15/ @ £5. 10/, f.o.b. shipping ports.

**Iron Rails**—Dull and nominal. Welsh, 30 lb. and upward, are quoted, nominally, £4. 15/ @ £5. 10/, f.o.b. shipping ports.

**Old Rails.**—The market continues unsettled. We quote Old D. H.'s, £3. 12/6 @ £3. 15/, c.i.f. New York.

**Scrap.**—The market is weaker. Heavy Wrought is quoted £3 @ £3. 2/6, c.i.f. New York. Bessemer Crop Ends are quoted 60/ for run of mill, f.o.b. shipping ports.

**Copper**—Is a little weaker and quotations are lower. Best Selected is quoted £68. 10/ @ £69. 10/, and Chili Bars, £63. 15/ @ £64. 5/.

**Tin.**—The market is irregular. Straits Ingot, spot, is quoted £93. 15/ @ £94. 10/, and futures, £94. 5/ @ £94. 15/.

**Tin Plates**—Are a little weaker. Quotations are:

| | | | |
|---|---|---|---|
| Tin Plates, 10 x 14, | 1st qual. | Charcoal | 19/6 @ 21/6 |
| " " | 2d " | " | 18/6 @ 19/ |
| " " | 1st " | Coke | 17/6 @ 18/ |
| " " | 2d " | " | 15/9 @ 16/3 |

**Spelter**—Is weaker and lower. We quote Ordinary, £14. 17/6 @ £15. 2/6 at shipping ports.

**Lead**—Is quiet and unchanged. Common English Pig is quoted £12. 10/ @ £12 15/.

**Freights.**—Steam from Glasgow to New York, 5/ @ 6/; Liverpool to New York, 4/ @ 5/; Liverpool to Philadelphia, 5/ @ 6/6 and London to New York, 7/6 @ 9/6.

## TRADE AND FINANCE.

Office of *The Iron Age*,
WEDNESDAY EVENING, August 29, 1883.

The outlook for autumn business is generally favorable, and in some quarters there are indications of increased activity. The turmoil in Wall street and enormous losses experienced by professional operators have had little effect in mercantile circles, except to induce a closer examination of credits and more cautious buying. In most departments speculation is further removed than ever from legitimate trade, and the prevailing low prices are believed to afford a substantial basis for business enterprise. That our banking institutions and other financial corporations have so successfully withstood the ordeal affords new grounds for confidence. According to a New Orleans paper, it is significant that so few business embarrassments have been reported in that section; the situation, we are told, could not be more healthy, and from the Northwest we have similar assurances. The favorable tenor of crop accounts is not interrupted. "The marked feature of the week," says a Chicago telegram of the 25th inst., "has been the brilliant weather for securing the spring wheat harvest. Up to date, harvesting has progressed satisfactorily in every respect. The great bulk of the grain is now all in shock. The quality and the quantity of the crop promise to exceed that of 1882. With present prices for wheat, the movement will be earlier than last year."

The weekly bank statement, as expected, showed a decrease in cash. Still, the total reserve is $5,197,500 greater than a year ago, while the loans outstanding are $8,151,000 less and the deposits $2,026,800 more. The banks have a surplus of $5,821,805, against $1,131,025, making their position a strong one, compared with last year, especially as gold was then leaving the country in large amounts. The round surplus now held is partly explained by the backward movement of the crops, but shipments of currency to the interior have at this late date fairly commenced. A temporary flurry in Philadelphia was occasioned by the action of the local banks in contracting their loans.

The imports of foreign merchandise at this port during the past week were very moderate, the total being $8,702,328, of which $5,714,293 represented general merchandise, and the remainder ($2,988,035) dry goods. Since Jan. 1 the imports amount to $305,236,519, compared with $332,179,372 for the corresponding period of 1882. The export movement of domestic produce from this port was again of very good proportions, the total last week being $8,623,298, which is $248,865 above that of the previous week and $1,379,160 larger than for the corresponding week last year. Since Jan. 1 the exports aggregate $233,829,810, compared with $218,272,092 for the corresponding period of 1882.

The amount of specie exported was $890,805, and the imports of specie reached the unusually large total of $1,380,941—the latter mostly doubloons, received via Havana. For the month of July, which was the first under the new tariff, as well as the first month of the new fiscal year, the total merchandise landed at this port was $38,305,847, being nearly $6,000,000 below the corresponding total for July, 1882. Reductions in the tariff, it would appear, had little of stimulating effect in face of the prevailing depression in trade. Turning now to the exports, the total for July was about $30,000,000, or about the same as for July, 1882, the expected greater outflow of produce this year failing thus far to meet expectations. According to intelligent estimates, the total shipments from all the ports for July will amount to $65,000,000, if they do not go beyond it, and show an excess of $5,000,000 to $7,000,000 above the imports. For the fiscal year ending June 30, 1883, the imports at all the ports of the United States from foreign ports amounted to $723,122,666, while the exports were $823,805,819, showing a balance of trade in favor of this country of $100,683,153.

The money market remains easy, with loans on call quoted 2 % @ 2½ %, and time money is 5½ % @ 6 %, 60 to 90 days. Supplies through the autumn months are expected to be equal to all ordinary requirements, speculation being inactive and Treasury disbursements liberal.

The posted rates for bankers' sterling were reduced to $4.83 for 60-day and $4.86 for sight, but the Canadian banks post rates ½¢ lower. The market is dull, and bankers are expecting arrivals of gold some time in October. This is predicated on the large prospective movement of grain and cotton, the present tendency of foreign exchange, and the fact that imports are comparatively light. In general trade during the past week dullness is the common complaint, more especially in our local markets. The gross bank clearings of this city, compared with the corresponding week last year, show a decrease of 13.3 %. Outside of New York the clearings show an increase of only .1 %, against an increase of 6.6 % the previous week. The principal gain was in Philadelphia, Pittsburgh, New Orleans, Louisville, Kansas City, Worcester, Syracuse and Memphis. Southern cities exhibit remarkably large gains, the clearings at Memphis being more than doubled. The manufacturing cities are below their usual average.

The London *Economist* of the 18th, in its money article, says: "The condition of business in the United States excites a good deal of attention in the city. There is no apprehension, however, of any financial difficulty on that side which is likely to cause any corresponding disturbance here. But the state of matters referred to produces an impression that it is more probable than it otherwise would appear to be that gold may be wanted for export to the United States. Such a prospect would render it additionally necessary for the Bank to maintain—and, if possible, strengthen—its reserve."

On the Stock Exchange the week has been feverish and unsettled. Occasional spurts have not availed to save the general list from further decline, equal in some instances to 5¾ and 6⅞—the latter Lake Shore and Northern Pacific Preferred. Oregon Transcontinental loses 3⅞. The Southwesterns are a little steadier. On Monday, Friday and Saturday alike, the bears were active and values depressed. On Monday the Villard shares, as on several previous days, were among the most active, and declined sharply under a pressure to sell. On Tuesday there was a sudden upward turn, some of the bears taking advantage of the large short interest, and the tone was strong at the close. To-day at the close prices were lower, the speculative element being still on the bear side. The principal dealings were in Lackawanna at 120½ @ 119; Denver at 26⅝ @ 25⅝; Lake Shore at 100⅞ @ 100; Louisville and Nashville at 43⅝, 43⅛, 43¾, 43¼; Michigan Central at 83¼ @ 82¼; New York Central at 115¾, 114¼, 114⅝, 114½; New Jersey Central at 80¼ @ 79¼; Northern Pacific at 38½ @ 38¼; Preferred at 72⅞, 72¼, 72¼, 72⅜; Oregon and Transcontinental at 62½, 61⅝, 62, 61¾; Reading at 50½ @ 50; St. Paul at 101⅝ @ 101⅜, and Union Pacific at 88¼ @ 87⅞.

In dry goods there is an improved demand at jobbing hands, and from all interior and Western markets there are accounts of a good distributing trade. Retailers are expecting a later autumn movement, but

through a longer period than is usual. In breadstuffs there is a tamer feeling, with only moderate buying for export. Wheat is steady, exports showing a decided increase from all the Atlantic ports—estimated at 2,500,000 bushels for the week. Cotton is higher, but quiet. Petroleum dull, but firm. Wool is inactive. Provisions are dull and prices have again slightly declined. Lard has a lower tendency. Sugar is quiet and firm on the basis of $6\frac{9}{16}$¢ @ $6\frac{11}{16}$¢ for raws. In coffee there are considerable sales on a basis of 9¼¢ for fair. The first bale of this year's cotton was sold in this city yesterday at 10½¢ ℔ lb. It was from North Carolina.

The following were the closing quotations for Government bonds:

| | Bid. | Asked |
|---|---|---|
| U. S. 4½, 1891, registered | 112¼ | 112⅜ |
| U. S. 4½, 1891, coupon | 113⅜ | 113½ |
| U. S. 4, 1907, registered | 119⅜ | 119½ |
| U. S. 4, 1907, coupon | 119⅜ | 119½ |
| U. S. 3 per cents | 103¼ | 103⅜ |
| U. S. Currency 6s, 1895 | 128 | — |
| U. S. Currency 6s, 1896 | 129 | — |
| U. S. Currency 6s, 1897 | 130 | — |
| U. S. Currency 6s, 1898 | 132 | — |
| U. S. Currency 6s, 1899 | 133 | — |

In State bonds, Alabama, Class A, sold at 81½—a decline of ¼ from the last previous sale. Missouri Sixes of 1887 sold at 107⅝, and do. Sixes of 1888 at 109.

MINING STOCKS.

The following were the closing quotations for mining stocks:

| | Bid. | Asked |
|---|---|---|
| Alice | 2.00 | 2.00 |
| Alta Mont | 5 | 6 |
| Belle Isle | 25 | 35 |
| Bodie | .... | 85 |
| Bulwe | 70 | .... |
| Bassick | .... | 10.00 |
| Barcelona | 30 | .... |
| Bradshaw | 20 | .... |
| Caled. B H | 45 | 65 |
| California | 34 | 40 |
| Climax | 9 | 10 |
| Con. Imp | 3 | 5 |
| Con. Va. | 64 | 66 |
| Chrysolite | 1.00 | 1.05 |
| Central Arizona | 15 | .... |
| Dahlonega | 2 | 3 |
| Durango | 4 | .... |
| Dunkin | 28 | 30 |
| Decatur | 2 | .... |
| Eureka Con | 6.00 | .... |
| East Or | 75 | .... |
| Father de Smet | 3.50 | 4.50 |
| Grand Prize | 29 | 30 |
| Gold Stripe | 17 | .... |
| Homestake | 17 | .... |
| Horn Silver | 6¾ | 7¼ |
| Elko Con | 9 | 11 |
| Hall-Ander | 93 | 1.05 |
| Iron Silver | 3.00 | 3.10 |
| Leadville Con | 30 | .... |
| L. Pittsburg | 55 | .... |
| L. Chief | 61 | 70 |
| Navajo | .... | 3.20 |
| N. Belle | 6 | 6¾ |
| Ori. & Mil | .... | 15 |
| Pi e Line cer | 1.07¼ | 1.07½ |
| Rappahannock | 6 | 8 |
| Robinson Con | 49 | .... |
| Sierra Nev | 4.50 | .... |
| Standard | .... | 5⅝ |
| Silver Cliff | .... | 12 |
| Sutro Tun | 19 | 20 |
| Stormont | 24 | .... |
| Sonora Con | 27 | 28 |
| Silver King | 6.00 | .... |
| Union Con | 5¾ | .... |
| Sierra Gr | 1.05 | 1.20 |
| B. H. & E. n | .... | ⅝ |

## GENERAL HARDWARE.

The deplorable calamity attending the loss of the yacht Mystery, mentioned in our last issue, has been emphasized by the finding of the body of Rupert Sargent, thus destroying the slender basis of hope that the missing members of the party might have been picked up by some outgoing vessel. Of Leicester and Rupert Sargent, the only sons of Mr. Geo. H. Sargent, we are glad to be able to speak in terms of warmest praise. They were young men of exceptional promise, and well fitted to make brilliant use of their opportunities. Leicester was 25 years old and Rupert 20. They were educated at Harvard. Both chose mercantile life, and entered the house of Sargent & Co., having natural and hereditary preferences for the hardware business. Leicester went to the works at New Haven, and was made assistant superintendent. About a year ago he married Miss Cora Glenn, daughter of Mr. James M. Glenn, of Cincinnati. He was eminently heroic and noble in his nature, and was a splendid example of intellectual, physical and moral development. His courage was remarkable, and he was ready to face any danger into which duty or the pursuit of pleasure might call him. He excelled in all manly sports, was a devoted student of the best classic and modern literature, possessed strong and positive characteristics, and in all the relations of life was enthusiastic, proud and honorable. Rupert, the younger, only a year out of college, was in the New York store of Sargent & Co., learning the business. He was brave, high-spirited loving and lovable, tender hearted, loyal to his many friends, entertaining, generous, and faithful to every duty and obligation. His life was full of music and brightness, and in the words of one of his nearest friends, "Death came to him when his heart was overflowing with happiness and love." The death of two young men so conspicuously fitted for a brilliant and useful life is an event so sad that comment seems out of place. The bereaved parents and friends are the recipients of the tenderest sympathy.

In some quarters we hear of an improvement in the amount of business, and many houses estimate that the sales of this month will be quite equal to those of last August. On the other hand, such a computation in the case of other houses has shown a decided falling off this year. There are a number of out-of-town buyers, but they seem very cautious in their purchases, and are not ordering very heavy lines. In regard to prices, the changes taking place are nearly all in a downward direction, and a weakness can be seen in some goods of which the quotations have not been changed.

There is no abatement in the demand for Nails, and they are still quoted at $3, with the usual discount to large buyers. Stocks are getting very low here, and assortments are so broken that considerable difficulty is experienced in filling good-sized orders. During the past week there has been a demand from Boston for special sizes, which indicates that the same condition of affairs exists there. The future looks very promising, and a continuance of the present condition of affairs is expected for at least next month, though, of course, a great deal depends on the stability with which prices are maintained in the West. The Riverside Iron Works, Wheeling, W. Va. have established an office with Durrie & McCarty, No. 97 Chambers street, New York, who will always be able to quote bottom prices for shipment to any point.

The houses importing Chesterman's Tapes have agreed on a uniform list of these goods, in order to conform the prices to the new duty of 45, instead of 35, per cent. levied on these goods, and to avoid the annoyance they have suffered in the past from the fact that the list prices of the various houses differed more or less from one another. The discount to the regular trade from the new list will probably be about 15 per cent. The following announcement gives the new list:

*To the Trade:* Owing to a recent decision increasing the duty on Chesterman's Tapes, the undersigned have agreed to adopt the following uniform list, to take effect September 1, viz.:

| | | | | |
|---|---|---|---|---|
| Feet | 25 | 33 | 40 | 50 |
| No. 33L, Linen each | $1 40 | 1.60 | 1.80 | 2.10 |
| " 34L, Metallic, each | 1.80 | 2.10 | 2.30 | 2.60 |
| " 38L, Steel | 5.10 | 6.00 | 7 00 | 8.40 |
| " 126, Metallic lines only, each | .90 | 1.10 | 1.30 | 1 50 |
| Feet | .... | 66 | 75 | 100 |
| No. 23L, Linen, each | $2.40 | 2.60 | 3.20 | |
| " 34L, Metallic, each | 3.00 | 3.30 | 4 20 | |
| " 38L, Steel, each | 10.80 | 12.20 | 15.20 | |
| " 126, Metallic lines only, each | 1.80 | 2.00 | 2.90 | |
| Feet | 3 | 4 | 5 | 6 |
| No. 198SS, Steel, Brass Case, Spring Top, doz | $13 60 | 16.00 | 17.60 | 20.00 |
| No. 36SS, Steel, G. S. Case, Spring Top, doz | 16.00 | 18.40 | 20.80 | 23.20 |
| Feet | 9 | 12 | 18 | |
| No. 193SS, Steel, Brass Case, pring Top, doz | $26.40 | 31.20 | 43.20 | |
| " 36SS, Steel, G S Case, Spring Top, doz. | 30.40 | 37.60 | 52.00 | |

Discounts, which are decreased, on application.

(Signed)
HERMANN BOKER & Co.,
W. H. BELCHER,
J. CURLEY & BRO.,
ALFRED FIELD & Co.,
FRASSE & Co.,
MONTGOMERY & Co.,
WEIBUSCH & HILGER HARDWARE Co.

The Corrugated Elbow Company, of Cincinnati, Ohio, have issued a reduced price list, which we print below. They claim superiority for their Corrugated Stove, Pipe Elbows over all pieced elbows, in that the curved shape and smooth surface on the inside prevent the accumulation of soot and dirt and promote the draft of the stove. They also say: "Red-hot fire will not affect the Corrugated Elbow. Expansion and contraction will open the joints of a pieced elbow, and thus destroy it; but the Corrugated Elbow, being made of one piece, can not come apart or break, but will last until the iron is worn out." The following are the list prices, subject to a discount of 20 & 10 & 10 per cent.:

CORRUGATED STOVE-PIPE ELBOWS, PER DOZ.

| Size. | Charcoal. | Re-galvanized, gauge, 20 to 22. | Planished. | Russia. |
|---|---|---|---|---|
| 4 inch | $2.00 | $4.00 | $3 40 | $3.40 |
| 4½ " | 2.50 | 4.50 | 5.00 | 5.00 |
| 5 " | 3.50 | 5.50 | 6.50 | 7.50 |
| 5½ " | 4.00 | 6.00 | 7.50 | 8.50 |
| 6 " | 4 50 | 7.50 | 8.50 | 9 50 |
| 7 " | 5.50 | 9.00 | 9 50 | 11.00 |

They also invite the attention of the trade to their Elbows for Water, Steam or Air Pipes, made of one piece, with flat corrugations or crimps, and to any desired angle. The following are the list prices, subject to the same discount as Stove-Pipe Elbows:

ELBOWS FOR WATER, STEAM OR AIR PIPES, PER DOZ.

| Size. | Plain tin. | Re-tinned. | Re-galvanized. |
|---|---|---|---|
| 2 inch | $1.25 | $1.70 | $1 70 |
| 2½ " | 1.50 | 2.00 | 2.00 |
| 3 " | 1.75 | 2.25 | 2.25 |
| 4 " | 2.50 | 3.40 | 3.40 |

The Dayton Screw Company, of which Albert G. Angell is president, are now fully equipped and are turning out a complete line of Screws, except a few sizes very little called for. These will be added before long. Their New York headquarters are with Graham & Haines, who are their general agents and will carry a full stock of Screws which they can always offer at factory prices.

Durrie & McCarty have recently taken the agency of Thomas Hinchliff's Nickel Plated and Japanned Shears and Scissors, which are known to the trade under the brands of XL and Ætna, of which the XL are warranted equal to any in the market.

In his advertisement on our 10th page, John Wilson, of Sheffield, Eng., prints a copy of an "acknowledgment and agreement" made by a person who had been infringing his trade-mark. The excellent reputation borne by the genuine John Wilson Butcher Knives will cause a general feeling of satisfaction that this infringement was so promptly stopped. Mr. Wilson "specially cautions traders generally against making, purchasing, selling, or in way dealing in articles intended to be an infringement of his rights, as he is fully prepared and determined to vindicate the high reputation of his goods in the law courts, if needful, however costly it may prove to aggressors."

We have received the following for publication:

BOSTON, MASS., August 17, 1883

*To the Trade:* We have this day engaged Messrs. Lovejoy & Drake, 101 Reade street, New York City, to represent us among the Hardware trade, and shall carry with them a complete line of our goods, comprising Blocks of every description, and those especially adapted to railroad and contract use. They are hereby authorized to quote you lowest factory prices for home and export trade. Soliciting for them a continuance of their trade, we remain,

Yours truly, BAGNALL & LOUD.

CINCINNATI, Aug. 18, 1883.

*To the Hardware Trade, Builders and Contractors:* It is known to most of the dealers in and consumers of Builders' Hardware in the United States that certain parties have recently commenced putting on the market Window-Sash Fasteners which are a close imitation of the Fastener patented in July, 1878 and February, 1879, to Mr. Jno. B. Morris, of our company, known as "The Morris Sash Lock." We therefore hereby notify the trade generally that our Mr. Morris, who is the holder of the Morris patents above referred to, has already brought suit in Connecticut against the Kempshall Mfg. Co. for the infringement of both of his patents by such Fasteners, asking a perpetual injunction and damages against them. All dealers in and users of all imitation Fasteners, who sell or keep them on sale, or use them, will render themselves liable to similar suits for damages for infringement.

THE MORRIS SASH LOCK MFG. CO.

The new catalogue of Machinery, Tools and Supplies for railways, machinists and mills, issued by Jackson & Tyler, is a volume of 148 large pages, containing illustrations, descriptions and price lists of the goods in which they deal. The comprehensive character of the book may be judged from the following general classification: Machine Tools, Lathes, Planers, Shapers, Power Drill Presses, Milling Machines, &c.; Machinists' Hand Tools, Boilermakers' Tools, Pipe Fittings and Brass Work, Pipe Fitters' Tools, Emery Grinders, Wheels, &c.; Taps, Dies and Screw Plates, Bolts, Nuts, Washers, Screws, &c.; Cotton and Woolen Mill Supplies, Foundry Supplies, Steam Pumps, Boiler Feeders, &c.; Shafting, Hangers and Pulleys; Engines.

## IRON.

**American Pig.**—Sales have been moderate during the past week, but inquiries have been more numerous than usual, indicating that there is a disposition among purchasers to look around for lower prices, rather than that they are more disposed to lay in large stocks of Pig Iron in advance of actual requirements. Some ground for this feeling among buyers may possibly be found in the fact that during the past week the arrivals of foreign Iron were greater than could be marketed, while, at the same time, strong efforts were made to obtain orders here for Southern Irons. The demand for the usual brands of No. 1 Iron sold in this market was, perhaps, only slightly affected by these causes, as they continue to be in short supply, and are therefore firmly held at $22 @ $22.50, at tidewater, while choice brands command $23, and even more. But No. 2 Iron is in ample supply, and though the quotations usually range from $19.50 to $21, the inside price is occasionally shaded, but, at the same time, it should be stated that this is not done by the manufacturers, but by speculators who have obtained control of Iron which they can sell under the market and yet make a small profit. Gray Forge sells at from $18.50 to $19.50, with a moderate demand. The entire market may be called irregular, with a slight tendency in buyers' favor. Next month, however, is expected to reverse this condition of affairs, but much depends upon the steadiness with which prices are maintained in the great producing centers of the country. At the Metal Exchange 1500 tons of Iron were sold during the past week.

**Scotch Pig.**—The arrivals during the week have been moderate, and some sales have been made, but all of the Iron imported could not be immediately disposed of, and several hundred tons were stored. All the irregular lots referred to last week have been sold, and that element of weakness has been eliminated. The range of prices at present is about as follows: Eglinton, $21 from ship; Carnbroe, $22.50 from ship and $23 from store; Coltness, $23.50 from ship; Shotts, $23 from ship; Glengarnock, $22.50 from ship and $23 from store; Gartsherrie, $24 from yard; Langloan, $23.50 from ship; Summerlee, $23 @ $23.25 from ship; Carron, $23 from ship; Dalmellington, $21 from ship. One sale of Schotts, ex ship, was effected at $24.

**English Iron.**—No sales of Bessemer Iron have been reported. We understand that good grades are offered at $21, while dealers generally claim they are firm at $21.50. Several hundred tons of Spiegeleisen have been sold at $31 for 20%; in 50-ton lots it commands $32 @ $33; 10% Spiegeleisen sells for about $26. A small quantity of Redcar No. 3 Middlesboro' Iron arrived during the week, and was sold at $19.50 for the greater portion and $20 for the remainder. It is possible that other importations of Middlesboro' Iron will be made in "tramp ships," which are now coming this way for grain cargoes, but in the present condition of the American Iron market it is unlikely that any large lots will be thus sent here.

**Bar Iron.**—Business is perhaps a trifle less active than last week, though an improvement is reported in a few instances. There is no effort being made to force sales, and the prices heretofore quoted are still in force, say, $2.30 @ $2.40 for Refined, and $2.10 @ $2.20 for Common, from store, and $2.05 for Refined from mill. The dullness of trade this week is partly attributable to the approaching close of the month, which has its influence on a great many buyers. There is some complaint that mills are slow in their deliveries, which would indicate that they have a good supply of orders. Dealers are hopeful of a good fall trade, which they are expecting will soon begin.

**Plate Iron.**—There continues to be a very good demand, which not only absorbs the current production, but also covers a few weeks of the future. The manufacturers of Plate Iron are, however, anxious to continue making a large output, and therefore prices are a shade easier than they were last week. We have quotations for large lots, as follows: Common, 2.6¢ @ 2.75¢; Refined, 2.75¢; Shell, 3⅛¢ @ 3¼¢; Flange, 4⅛¢ @ 4¼¢; extra Flange, 5¢ @ 5¼¢.

**Sheet Iron.**—The demand is exceptionally good for the season, more particularly for the heavy grades. We quote from 3.1¢ up, according to gauge.

**Structural and Shaped Iron.**—There continues to be a good demand for bridge work and buildings. We continue to quote Beams at 3 5¢, in round lots, delivered on the wharf; Angles, 2.75¢, and Tees, 3.25¢, out of store.

**Steel.**—Trade is increasing, but prices continue to be unsatisfactory. The following are nominal prices for American Steel, which large buyers can shade considerably: Tool Steel, 11¢; Crucible Machinery, 6½¢ @ 7¢; Bessemer and Open-hearth Machinery, 4¢ @ 5¢. There are frequent inquiries for Bessemer Bars, to be used instead of Iron, but the price asked, which is about 3½¢, is about ½¢ too high to induce business. The File Steel syndicate collapsed on Friday last; the base price was 7½¢, but is now 1½¢ lower for large lots. A sale of 1500 to 2000 tons of Steel Plates has been made, which are to be used in shipbuilding. There is a large amount of business in Steel Plates now in prospect, as a great deal of such material will be used in the new Government cruisers, and will be required for other vessels which are in course of construction. Prices for ordinary lots are about 5¾¢ @ 6¼¢, according to quality. There is a good demand for best English Tool Steel, which is quoted at 15½¢.

**Steel Rails.**—We hear of sales of Rails by Western mills, which are rumored to be large, but exact quantities and prices have not been disclosed. Eastern mills report numerous inquiries for deliveries during the coming year, but no sales. Prices at mill are quoted from $37.50 to $38, for, say, December delivery.

**Old Rails.**—We hear of sales of 500 tons of foreign Ts at $23, and 1000 tons domestic at $22.75, but the latter sale is exceptional, in view of the numerous inquiries for Old Rails and the offers which have been recently made by buyers. A good-sized lot is wanted at $23.50, but it cannot be had. The supply is very limited, and sales are therefore wide apart. Quotations range from $23 to $24.

**Scrap Iron.**—Trade continues to move in a retail way. Sales of a few hundred tons are reported. No. 1 Selected Wrought has been sold at $25 from yard principally, though some has been disposed of for $24. Lots are offered at $23 for shipment, but there is no disposition to stock up in the present condition of trade. Sales of Light Scrap have been made, such as Cotton Ties, Hoops, Sheet Iron, &c., at $16 @ $17; Good Machinery Cast Scrap sells at from $17 to $19, according to quality; Stove Plate is quoted at $14 @ $15.

## SALES ON METAL EXCHANGE.

The following sales have been reported during the week:

THURSDAY, August 23.

23 tons Malacca Tin, spot ..... 21⅜¢

FRIDAY, August 24.

No transactions.

SATURDAY, August 25.

| | | | |
|---|---|---|---|
| 100 tons | American Pig, No. 1, Nov | | $21.87½ |
| 300 " | " " " " | | 21.87½ |
| 100 " | " " " " | Dec | 22.00 |
| 200 " | " " " " | " | 22.00 |
| 100 " | " " " " | Jan | 22.12½ |
| 10 " | Straits Tin, Nov | | 21¢ |
| 10 " | " " " | | 21.1¢ |

MONDAY, August 27.

| | | | |
|---|---|---|---|
| 100 tons | American Pig, No. 1, Jan | | $22.25 |
| 100 " | " " " " | | 22.25 |
| 300 " | " " " " | | 22.25 |

TUESDAY, August 28.

203 tons American Pig, No. 1, Dec ..... $22

WEDNESDAY, August 29.

No transactions.

## METALS.

**Copper.**—There has been more doing, and there is a better feeling, 400,000 lb Lake selling at 15¢ @ 15¼¢, while other brands are worth 14¢ @ 14½¢. Most Brass manufacturers are quite busy. The product of Copper of the Lake Superior mines has not increased so far this year, and may be even about 500 tons less than last year for the corresponding time, but this deficiency will probably be made up by a better yield in the closing months of the present year; it will therefore be safe to estimate the 1883 product at 26,000 tons of 2240 lb, the same as in 1882. Of Western mines, those of Montana have taken the lead; they will produce this year at least 9000 tons of pure Copper. Next follows Arizona with nearly 8000 tons. The decline in the price of Copper restricted production in this Territory in some measure in those mines that had to pay high freight rates for transportation to the railroad depots. From other sources of supply, such as New Mexico, Colorado, Dakota, Wyoming, &c., we value the amount at about 3000 tons. Thus the yield from all mines in the country would give us an aggregate of 46,000 tons; adding thereto the stock left from last year, estimated at 10,000 tons, it will be seen that we shall have had to deal in all 1883 with a joint available supply of 56,000 tons of 2240 lb. Export made and yet to be made, as well as estimated consumption, we figure up as follows:

EXPORT.

| | Tons. |
|---|---|
| Lake Superior Ingots shipped and contracted for | 6,500 |
| Cartridges shipped and contracted for | 1,000 |
| Baltimore and other brands of Ingot Copper | 1,500 |
| Montana and Arizona Pigs, Matte and Ores | 10,000 |
| | 19,000 |
| Consumption | 32,000 |
| Total | 51,000 |

Deducting these amounts disposed of, together 51,000, from the 56,000 tons of supply above referred to, it will be seen that there would be left at the close of the present year a stock of 5000 tons. We may add, with reference to the export from Montana, estimated by us at 9000 tons, that the whole of it is going to England on account of its Silver contents, and that about 1000 tons of Arizona Copper, in pigs, partly shipped and in course of shipment, proceed to France. As for the consumption of Copper in this country, all we can say is that the same is going on steadily and regularly; there exists little doubt at this writing as to its proving at least equal to what it was in 1882. If, therefore, the figures of our statement be verified by facts, and we carry into 1884 an amount of stock not exceeding 5000 tons, there is strong reason to believe that the price of Copper will appreciate toward the close of navigation, in view of the insufficiency of supply to carry the country through the winter months. Such rise in value would, in our estimation, take place from the inherent strength of the position, unaided by speculation for an advance. Should speculation co-operate, the rise would be all the more rapid. London cabled yesterday, £68, Best Selected, and £64, Chili Bars. To-day we receive from there the ensuing cablegram: "Market a little weaker and quotations lower. Best Selected, £68. 10/, and Chili Bars, £63. 15/ @ £64. 5/." Manufactures may be quoted as under: Bottoms, 24¢; Braziers, 24¢; Sheathing, 22¢, and Bolt Copper, 24¢.

**Tin.**—Heavy arrivals have come upon a market not over active; hence large lines Straits would not bring to-day over 21¢ @ 21⅛¢, while Lamb and Flag is worth 22¼¢. London cabled £94, Straits, yesterday, while to-day we are wired from there to the following effect: "Market irregular. Straits Ingot, spot, £93. 15/ @ £94. 10/." *Tin Plates.*—The market has been steady, with a good jobbing demand. There are no large stocks; the stock of Coke Tin, especially, is low. We quote at the close, large lots, ordinary brands, ℔ box: Charcoal Bright, $5.62½ @ $6.12½; do. Ternes, $5.15 @ $5.35; Coke Tin, $5.05 @ $5.20, and do. Ternes, $4.87½. Liverpool is steady at 16/, Coke, and 18/6 @ 20/, Charcoal. From London we are informed, per cable, that Tin Plates are a little weaker.

**Lead.**—Subsequent to our last week's report some 200 tons more Common Domestic sold at $4.20, when suddenly a stronger feeling manifested itself, with $4.35 asked, a few smaller lots afterward selling at $4.35, the market winding up within the range of $4.30 @ $4.35. *Refined* will not, for the moment, bring more than Common Domestic. In St. Louis, since we reported last, 500 tons Hard actually sold at 4¢, but since then $4.10 is asked, and for Soft, $4.10 @ $4.12½. From London we receive the ensuing cable message: "Lead is quiet and unchanged. Common English Pig, £12. 10/ @ £12. 15/." Manufactures are quoted as follows: Lead Pipe, 6¾¢; Sheet Lead, 7½¢; Tin-lined Lead Pipe, 15¢ ℔ lb, and Block-Tin Pipe, 45¢, less the usual discount to dealers.

**Spelter and Zinc.**—The revival of activity so long looked forward to has not yet come, so that dealings for the week under review have been confined to trifling lots at 4½¢ @ 4⅝¢, while Silesian is nominally worth 5¢ @ 5⅛¢. We quote Bertha Refined, 7¾¢, and Bergenport, 9½¢. *Sheet Zinc* is moderately active at 6¢ @ 6⅛¢. From London we are cabled to-day as follows: "Market weaker and lower. Ordinary, £14. 17/6 @ £15. 2/6."

**Antimony**—Has been dealt in to a moderate extent only at 9¼¢ for Hallett, and 10¼¢ for Cookson.

## FOREIGN TRADE MOVEMENTS.

Included in the imports for the week ending August 24 were leading articles of merchandise valued as follows:

| | Pkges. | Value. |
|---|---|---|
| Antimony | 100 | 5,425 |
| Anvils | 117 | 1,006 |
| Brass goods | 33 | 2,858 |
| Bronzes | 28 | 4,404 |
| Chains and anchors | 6 | 240 |
| Clocks | 47 | 5,286 |
| Copper | .... | 1,577 |
| Cutlery | 122 | 37,243 |
| Guns | 333 | 55,807 |
| Hardware | 3 | 255 |
| Iron, pig, tons | 3,118 | 54,426 |
| Iron, sheet, tons | 136 | 6,105 |
| Iron ore, tons | 2,622 | 5,232 |
| Iron tubes | 29 | 159 |
| Iron cotton ties | 5,782 | 4,681 |
| Iron, other, tons | 1,044 | 41,030 |
| Lead, pigs | 792 | 50,720 |
| Machinery | 190 | 17,306 |
| Metal goods | 411 | 21,673 |
| Needles | 22 | 3,840 |
| Nickel | 20 | 3,000 |
| Old Metal | .. | 532 |
| Platina | 4 | 10,701 |
| Plated-ware | 21 | 5,149 |
| Pins | 54 | 2,567 |
| Percussion caps | 43 | 7,803 |
| Saddlery | .... | 614 |
| Steel | 17,823 | 63,281 |
| Spelter | 167,129 | 6,527 |
| Silverware | 3 | 409 |
| Tin, bxs | 38,502 | 277,132 |
| Tin, slabs, 8,834; lbs., 852,741 | ..... | 181,352 |
| Wire | 565 | 10,480 |
| Zinc | 56,089 | 2,354 |
| Zinc oxide | 300 | 2,975 |

The imports of cutlery and hardware compare with previous dates as follows:

| | For the week. | 34 weeks of 1883. | Same time 1882. |
|---|---|---|---|
| Cutlery, pkgs | 122 | 5,122 | 4,908 |
| Hardware, pkgs | 3 | 824 | 738 |
| Iron, R. R., bars | .... | 10,049 | 83,040 |
| Lead, pigs | 792 | 6,224 | 18,675 |
| Steel, pkgs | 17,823 | 2,272,966 | 1,327,840 |
| Tin, bxs | 38,502 | 1,342,089 | 1,479,645 |
| Tin slabs, lb | 852,741 | 13,845,954 | 11,274,099 |

## EXPORTS

***Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the week ending August 28, 1883.***

***Dutch West Indies.***

| | Quan. | Val. |
|---|---|---|
| Mf. iron, pkgs | 8 | $158 |
| Sew. ma., cs. | 2 | 8 |
| Hdw., pkgs. | 8 | 45 |
| Clocks, case. | 1 | 24 |
| Buckles, cs. | 2 | 192 |
| Plm. gals. | 2338 | 217 |

***Antwerp.***

| | | |
|---|---|---|
| Sew. ma., cs. | 103 | 1,588 |
| Ptm , gls | 1,461,308 | 111,827 |
| Mf. iron, pkgs. | 4 | 78 |
| Ir. molds, bbls | 3 | 1,100 |

***Rotterdam.***

| | | |
|---|---|---|
| Ptlm., gals. | 342,255 | 27,375 |
| Pumps, pkgs. | 3 | 108 |

***Hamburg.***

| | | |
|---|---|---|
| Mf. iron, pkgs | 85 | 999 |
| Sew. ma., cs. | 1106 | 17,227 |
| Revolvers, cs. | 6 | 4,011 |
| Nails, kegs. | 22 | 90 |
| Clocks, pkgs. | 12 | 212 |
| Spike blocks, bdls | 324 | 357 |
| Hdw., cs. | 29 | 690 |
| W. gds., case. | 1 | 225 |
| Rifles, cs. | 2 | 75 |
| Ptlm., gals. | 894,497 | 68,950 |
| Mach'y, pkgs. | 20 | 2,895 |
| Chain, bbls. | 7 | 400 |
| Saw teeth, cse | 1 | 200 |

***Christiania.***

| | | |
|---|---|---|
| Cutlery, cs | 8 | 320 |
| Mf iron, pkgs. | 25 | 450 |

***Dutch East Indies.***

| | | |
|---|---|---|
| Ptlm., gals. | 491,820 | 49,712 |

***Bremen.***

| | | |
|---|---|---|
| Sew. ma., cs. | 27 | 700 |
| Ag. imp., pkgs | 18 | 959 |
| Pumps, pkgs. | 5 | 147 |
| Mf iron, pkgs. | 43 | 585 |
| Copper, bars. | 207 | 8,200 |
| Mach'y, pkgs. | 7 | 468 |
| Hdw., cs. | 68 | 1,381 |
| Ptm., gals | 385,800 | 29,500 |

***Amsterdam.***

| | | |
|---|---|---|
| Mf. iron, pkgs | 116 | 1,416 |
| Mach'y, pkgs. | 8 | 270 |
| Scales, cs | 6 | 225 |
| Ag. imp., pkge | 1 | 32 |
| Pumps, pkgs. | 32 | 1,700 |
| Clocks, pkgs. | 4 | 200 |
| Hdw., cs. | 3 | 299 |

***Copenhagen.***

| | | |
|---|---|---|
| Hdw., pkgs. | 314 | 6,026 |
| Clocks, pkgs. | 3 | 203 |
| Ag. imp. pkgs | 10 | 360 |
| Mf. iron, pkgs | 6 | 198 |
| Mach'y, pkgs. | 2 | 225 |
| Valves, case. | 1 | 107 |

***Liverpool.***

| | | |
|---|---|---|
| Ag. imp., pkgs | 9 | 268 |
| Copper, bbls. | 100 | 13,590 |
| Mach'y, pkgs. | 48 | 3,483 |
| Guns, cs. | 29 | 523 |
| Pumps, pkgs. | 5 | 260 |
| Cutlery, case. | 1 | 628 |
| Hdw., pkgs. | 17 | 621 |
| Tacks, kegs. | 16 | 132 |
| Nkl. plate, cs. | 4 | 450 |
| Mf. iron, pkgs. | 2 | 90 |
| Platinum, box | 1 | 230 |
| Copper, cks. | 45 | 7,848 |
| Sew. ma., cs. | 9 | 191 |
| Clocks, pkgs. | 170 | 4,425 |
| Cop. mat., sks. | 3628 | 29,670 |
| Rifles, cs. | 150 | 31,500 |
| Tin, pkgs. | 9 | 48 |
| W. mills, cs. | 3 | 45 |
| Scales, cs. | 13 | 400 |

***Cronstadt.***

| | | |
|---|---|---|
| Ptlm., gals. | 149,193 | 11,928 |

***Colberg.***

| | | |
|---|---|---|
| Ptlm., gals. | 115,775 | 9,300 |

***Stettin.***

| | | |
|---|---|---|
| Ptlm., gals. | 321,908 | 25,319 |

***Hull.***

| | | |
|---|---|---|
| Scales, cs. | 15 | 276 |
| Ptlm., gals. | 175,298 | 14,110 |
| Clocks, pkgs. | 60 | 823 |
| Mach'y, pkgs. | 6 | 835 |
| Ag. imp, pkgs | 129 | 2,351 |
| Hdw., cs. | 111 | 2,024 |
| Pumps, pkgs. | 9 | 113 |
| Mf. iron, pkgs | 9 | 260 |
| Guns, case. | 1 | 30 |

***London.***

| | | |
|---|---|---|
| Ag. imp., pkgs | 268 | 4,410 |
| Mach'y, pkgs. | 13 | 1,307 |
| Pumps, pkgs. | 5 | 522 |
| Scales, cs | 15 | 190 |
| Eyelets, cs. | 13 | 909 |
| Guns, cs. | 19 | 5,370 |
| Scabbards, cs. | 2 | 1,028 |
| Cartridges, cs | 3 | 4,267 |
| Tacks, cs. | 2 | 65 |
| Hdw., pkgs | 173 | 2,687 |
| Clocks, cs. | 162 | 6,550 |
| Saws, cs. | 10 | 431 |
| Sew ma., cs. | 1106 | 26,508 |
| Wire, case | 1 | 158 |
| Mf. iron, pkgs | 20 | 352 |
| Bayonets, cs. | 11 | 3,004 |
| Wat. wheels | 3 | 150 |
| Mf. cop., case. | 1 | 275 |

***Glasgow***

| | | |
|---|---|---|
| Clocks, pkgs. | 95 | 375 |
| Mach'y, pkgs. | 3 | 1,000 |
| Ag. imp., pkgs. | 2 | 81 |
| Shears, case. | 1 | 70 |
| Sew. ma., cs. | 695 | 11,569 |

***Bristol.***

| | | |
|---|---|---|
| Mach'y, pkgs | 7 | 1,200 |

***Exeter.***

| | | |
|---|---|---|
| Ptlm., gals. | 121,120 | 13,080 |

***Leith.***

| | | |
|---|---|---|
| Sew. ma., cs. | 601 | 4,530 |
| Hdw., cs. | 2 | 20 |

***Queenstown.***

| | | |
|---|---|---|
| Ptlm., gals. | 245,514 | 19,640 |

***Gibraltar.***

| | | |
|---|---|---|
| Ptlm., gals. | 423,990 | 38,747 |

***New Zealand.***

| | | |
|---|---|---|
| Hdw., case | 1 | 93 |

***Nova Scotia.***

| | | |
|---|---|---|
| Ptlm , gals | 13,800 | 1,380 |
| Ir. ore, tons | 340 | 1,700 |

***Newfoundland.***

| | | |
|---|---|---|
| Ptlm., gals. | 2580 | 206 |

***New Brunswick.***

| | | |
|---|---|---|
| Ir. ore, tons. | 210 | 1,050 |
| Spikes, kegs. | 10 | 36 |
| Tin plts. | 76 | 1,197 |
| Ptlm , gals. | 46,750 | 4,800 |
| Hdw., cs. | 13 | 402 |
| Tin plate, bxs. | 300 | 1,200 |
| Lead, pigs. | 81 | 296 |

***British Possessions in Africa.***

| | | |
|---|---|---|
| Hdw., pkgs. | 9 | 182 |
| Ptlm., gals. | 64,320 | 6,567 |
| Mf iron, pkgs | 54 | 155 |
| Ag. imp., pkgs | 4 | 404 |
| Rifles, cs. | 4 | 325 |
| Cutlery, cs. | 45 | 570 |
| Clocks, pkgs. | 2 | 70 |

***British West Indies.***

| | | |
|---|---|---|
| Mf iron, pkgs | 207 | 197 |
| Hdw., pkgs. | 7 | 90 |
| Sew. ma., cse. | 1 | 20 |
| Ptlm., gals. | 16,189 | 1,912 |

***British East Indies.***

| | | |
|---|---|---|
| Ptlm. gals. | 246,000 | 25,215 |

***Havre.***

| | Quan. | Val. |
|---|---|---|
| Scrap plat..ck | 1 | $400 |
| Ptlm., gals. | 810,159 | 60,299 |
| Mf. iron, pkgs | 7 | 205 |
| Mach'y, pkgs. | 5 | 3,226 |
| Sew. ma., cs. | 355 | 6,904 |
| Pumps, pkgs. | 3 | 615 |
| Copper, cks. | 216 | 40,950 |

***Cuba.***

| | | |
|---|---|---|
| Mach'y, pkgs. | 1322 | 11,098 |
| Hdw., pkgs. | 71 | 1,255 |
| Nails, cs. | 2 | 56 |
| Scales, cs | 3 | 34 |
| Pumps, pkgs. | 3 | 148 |
| Ptlm., gals. | 123,659 | 10,966 |
| Clocks, case. | 1 | 55 |
| Valves, case. | 1 | 245 |
| Smoke-stack. | 1 | 175 |
| Mf. iron, pkgs | 169 | 2,331 |
| Cutlery, cs. | 82 | 1,043 |
| Tin plate, cs. | 2 | 77 |
| Ag. imp., pkgs | 9 | 23 |
| Scales, case. | 1 | 31 |
| Nails, kegs. | 185 | 575 |
| Iron kiln | 1 | 2,150 |
| Tubing, pkgs. | 24 | 3,090 |

***British Honduras.***

| | | |
|---|---|---|
| Ptlm., gals. | 2520 | 244 |
| Mf. iron, pkgs | 6 | 69 |
| Hdw., cs. | 6 | 185 |
| Sew. ma., cs. | 12 | 96 |
| Windlass | 1 | 57 |
| Nails, kegs. | 5 | 17 |

***Dunkirk.***

| | | |
|---|---|---|
| Ptlm., gals. | 229,693 | 16,590 |

***Marseilles.***

| | | |
|---|---|---|
| Ag. imp., pkge | 1 | 38 |

***United States of Colombia.***

| | | |
|---|---|---|
| Hdw., pkgs. | 179 | 4,547 |
| Mach'y, pkgs. | 145 | 4,900 |
| Cutlery, cs. | 45 | 781 |
| Cartridges, cs | 11 | 240 |
| Scales, cs. | 51 | 399 |
| Nails, kegs. | 125 | 460 |
| Yel. metal, cs. | 4 | 186 |
| Tacks, cs. | 2 | 48 |
| Mf. cop., case | 1 | 53 |
| Iron safes. | 4 | 620 |
| Zinc, cks | 2 | 71 |
| Steel bars. | 8 | 133 |
| Chains casks | 6 | 322 |
| Ag. imp., pkgs | 8 | 228 |
| Cages, case. | 1 | 34 |
| Mf. iron, pkgs | 162 | 2,904 |
| Sew. ma., cs. | 142 | 4,857 |
| Ptlm , gals. | 9875 | 1,284 |
| Revolvers, cs. | 9 | 2 175 |
| Pumps, pkgs. | 4 | 59 |
| Locomotive. | 1 | 12,000 |
| Clocks, cs. | 15 | 351 |
| Iron, pkgs. | 283 | 310 |
| Dredge & derrick | 1 | 15,000 |
| I. roof'g, bdls. | 190 | 2,200 |
| Spikes, pkgs. | 10 | 49 |
| Car whls & a., prs | 50 | 2,075 |
| Rifles, case. | 1 | 102 |

***Venezuela.***

| | | |
|---|---|---|
| Ptm., gals. | 11,335 | 1,146 |
| Sew. ma., cs. | 11 | 201 |
| Hdw., pkgs. | 9 | 139 |
| Mf. iron, pkge | 1 | 32 |
| Buckles, cs. | 2 | 135 |
| Mach'y, pkgs. | 2 | 117 |

***Uruguay.***

| | | |
|---|---|---|
| Ag. imp , pkgs | 139 | 5,850 |
| Iron safe. | 1 | 50 |
| Clocks, pkgs. | 42 | 680 |
| Hdw., cs. | 14 | 200 |
| Ptlm , gals. | 130 000 | 12,300 |

***Fiume.***

| | | |
|---|---|---|
| Ptlm, gals. | 230,304 | 18,000 |

***Hayti.***

| | | |
|---|---|---|
| Scales, cs. | 5 | 190 |
| Ptlm., gals. | 3445 | 316 |
| Hdw , pkgs. | 4 | 66 |
| Nails, kegs. | 31 | 111 |
| Mf. iron, pkgs | 14 | 461 |
| Chains | 6 | 130 |

***Argentine Republic***

| | | |
|---|---|---|
| Ptlm. gals. | 41,000 | 4,500 |
| Hdw , cs. | 266 | 4,094 |
| Sew. ma., cs. | 67 | 1,189 |
| Cartridges, cs | 6 | 82 |
| Pumps, pkgs. | 22 | 773 |
| Wash wrgrs., pkgs. | 25 | 489 |
| Nails, pkgs. | 15 | 210 |
| Mach'y, pkgs. | 48 | 1,909 |
| Firearms, cs. | 4 | 792 |
| Mf. iron. pgs. | 4 | 190 |
| Ag. imp., pgs. | 136 | 4,581 |
| Scales, cs. | 20 | 312 |

***Brazil.***

| | | |
|---|---|---|
| Ptlm , gals. | 25,506 | 2,810 |
| Scales, cs. | 18 | 70 |
| Rifles, cs. | 2 | 355 |
| Sew. ma., cs. | 32 | 527 |
| Cartridges, cs. | 6 | 140 |
| Pr'ting mat'ls, pkgs. | 4 | 43 |
| Pumps, case. | 1 | 50 |
| Casters, cs. | 5 | 110 |
| Hdw., pkgs. | 259 | 2,213 |
| Bar tin, cask. | 1 | 110 |
| Cutlery, cs. | 26 | 1,109 |
| Nails, kegs. | 112 | 345 |
| Saws, case. | 1 | 65 |
| Ag. imp., pkgs | 24 | 320 |
| Mach'y, pkgs. | 21 | 300 |
| Clocks, cs. | 59 | 1,311 |
| Revolvers, cse | 1 | 167 |

***Trieste.***

| | | |
|---|---|---|
| Ptlm., gals. | 150,600 | 10,500 |

***Genoa.***

| | | |
|---|---|---|
| Pumps, pkg. | 3 | 441 |

***Mexico.***

| | | |
|---|---|---|
| Cutlery, cs. | 100 | 2,629 |
| Hdw., pkgs. | 109 | 3,804 |
| Mf. iron, pkgs | 404 | 3,148 |
| Tin, bxs | 12 | 60 |
| Cages, cs. | 3 | 48 |
| Nails, kegs. | 191 | 170 |
| Revolvers, cs. | 2 | 1,079 |
| Tacks, cs. | 15 | 575 |
| Qcksilver, flks | 2 | 55 |
| Ag. imp., pkge | 1 | 65 |
| Cop. g'ds, cs. | 1 | 46 |
| Sew. ma., cs. | 79 | 2,116 |
| Nails, cs. | 15 | 80 |
| Clocks, cs. | 20 | 521 |
| Ptlm., gals. | 75,715 | 7,924 |
| Brass g'ds, cs. | 11 | 907 |
| Cartridges, cs. | 10 | 287 |
| Pumps, pkgs. | 3 | 135 |
| Scales, cs. | 10 | 131 |
| Iron bdls. | 65 | 375 |
| Mach'y pkgs. | 291 | 16,754 |
| Locomotives. | 5 | 58,553 |

***St. Pierre (Miquelon.)***

| | | |
|---|---|---|
| Sew. ma., cs. | 3 | 40 |
| Mf. iron, pkgs | 20 | 211 |
| Ptlm., gals. | 2300 | 200 |
| Mt. sh'gles, bxs | 17 | 137 |

***French West Indies.***

| | | |
|---|---|---|
| Ptlm., gals. | 2000 | 185 |

***Porto Rico.***

| | | |
|---|---|---|
| Ptlm , gals. | 2000 | 180 |

***Central America.***

| | | |
|---|---|---|
| Hdw., cs. | 14 | 224 |
| Wire g'ds, cs. | 5 | 86 |
| Nails, kegs. | 8 | 30 |

***Japan.***

| | | |
|---|---|---|
| Mf. iron, pkgs. | 3 | 125 |
| Ptlm., gals. | 610,000 | 58,531 |
| Cartridg's, cs. | 4 | 80 |

***Sandwich Islands.***

| | | |
|---|---|---|
| Ptlm., gals. | 60,000 | 7,500 |
| Mach'y, pkgs. | 2 | 275 |
| Mf. iron, pkgs | 50 | 430 |
| Hdw., cs. | 3 | 150 |

## IMPORTS

***Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending Aug. 29, 1883.***

***Hardware.***

Bloom N.
Cases. 8
Boker Hermann & Co.
Guns, cutlery and hdw., cs., 50
De Castro,
Mach'y, cs., 4
Field Alfred & Co.
Guns, cs., 12
Anvils, 52
Mdse., pkgs., 13
Cutlery, cs., 6
Folsom H. & D.
Arms, cs., 10
Flor & Kohfel,
Mach'y, box, 1
Godfrey Chas. J.
Arms, cs., 8
Godwin R. J. & Son,
Mach'y, case, 1
Geisenheimer & Co.
Saws, case, 1
Graef Cutlery Co.
Mdse., cs., 22
Cutlery, cs., 8
Ginnel & Co.
Cases. 2
Hammacher A. & Co.
Ironware, cs., 26
Jex W. & Co.
Case, 1
Kastor —,
Cutlery, case, 1
Klaaberg —,
Mach'y, pkgs, 2
Markt & Co.
Cases. 16
McCoy & Sanders,
Cases. 11
Moore's Sons J. P.
Arms, cs., 21
Moss F. W.
Files, case, 1
Newhall U. Mill Co.
Mach'y, cs., 13
Mach'y, pcs., 14
Outerbridge A. E. & Co.
Chains, case, 1
Probst Fred. & Co.
Mach'y, box, 1
Reonds & Kelley,
Electric machine, 1
Riesthal A. de & Co.
Nails, cs., 40
Schwab & Bros.
Mach'y, cs., 6
Schoverling, Daly & Gales.
Arms, cs., 13
Mdse., cs, 13
Sellers W. B.
Mdse., cs., 3
Squires, H. C.
Mdse., cs., 25
Vom Cleff & Co.
Mdse., cs., 4
Cutlery, cs., 2
Wiebusch, Hilger & Co.
Hdw. and cutlery, pkgs., 9
Wallach A. & E.
Cases, 4
Wallach Willy,
Cases, 4
Ward Alsine,
Mdse., cs., 3
Wehric —,
Iron bungs, cs., 7
Windmuller & Roelker,
Arms., cs., 5
Wuiff, Worms & Co.
Cases. 5
Order,
Cases, 25

***Iron.***

Alexandre F. & Co.
Iron drums, cs, 4
Baring Bros. & Co.
Rivet rods, coils, 3408
Bars, 2777
Rods, coils, 664
Wire rods, coils, 15,862
Pieces, 40
Cases. 19
Brockner Bros.
Spiegel, tons, 98
Brown Bros. & Co.
Bundles, 423
Wire rods, coils, 820
Coddington T. B. & Co.
Bundles. 330
Boxes, 51
Crocker Bros.
Spiegel, tons, 93
Froment F. L. & Co.
Sheets, 270
Bars, 194
Lee Jas. & Co.
Pig, tons, 100
Lundberg Gust.
Bars, 18,882
Bundles 413
McComb J. J.
Cotton ties, bdls., 2200
McCoy & Saunders,
Manf. ore, cks., 6
Meissner, Ackermann & Co.
Wire rods, coils, 1725
Meyer G. A. & E.
Oxide, cks., 25
Naylor & Co.
Bars, 140
Spiegel, cks., 47
Rods, coils, 671
Paulding, Remble & Co.
Iron shaft, 1
Perkins & Choate,
Spiegel, tons, 400
Stetson G. W. & Co.
Pig. tons, 400
Tillotson L. G. & Co.
Gal. wire, coils, 206
Williams H. E.
Ore, cks., 93
Wood, Niebuhr & Co.
Wire rods, pkgs., 202
Order,
Beams, 74
Pig, tons, 2700
Pig, lots, 2
Rods, bdls, 2140
Gal. wire, coils, 504
Ore, tons, 923
Wire rods, coils, 6051
Sheets, bdls., 543
Spiegel tons, 417
Cotton ties, bdls., 3200
Old rails, tons, 9
Tubes, 262

***Steel.***

Baring Bros. & Co.
Rods, bdls., 10,692
Brown Wm.
Cases. 7
Bundles, 126
Bars, 6
Cary & Moen,
Wire rods, bdls., 117
Bess, rods, bdls., 407
Downing, Sheldon & Co
Bundles. 55
Friedman & Lauterjung,
Steelware, cs., 5
Moss F. W.
Bundles, 139
Bars, 34
Pauls A. & A.
Steelware, cs., 2
Plock & Co.
Bands, 82
Car wheels, 46
Scott Thos.
Bundles, 160
Seligman J. & W. & Co
Rails, 1080
Wagner W. F.
Wagner W. F.
Bundles, 93
Bars, 2
Cases, 3
Plates, 46
Order,
Bands, 315
Forgings, 16
Bars, 2
Bales, 62
Old spring, tons, 101
Bundles, 358
Rods, bdls., 324
Spring, bdls., 4
Rails, 3225
Steelware, cs., 5
Cases. 3
Wire rods, bdls., 5125
Wire rods, coils, 178

***Metals.***

Allis & Co.
Tubes, cs., 11
Ashby Morris,
Zinc oxide, bbls., 75
Bank of Montreal,
Tin plates, bxs., 4321
Baring Bros. & Co.
Tin plates, bxs., 800
Bell —,
Zinc, pkgs., 4
Bruce & Cook,
Tin plates, bxs., 1125
Boutillier & Co.
Zinc, pkgs., 10
Carter, Hawley & Co.
Tin, slabs, 151
Dickerson, Van Duzen & Co.
Tin plates bxs., 4789
Echeverrin M. & Co.
Tin, bars., 80
Katz Bros.
Tin, slabs, 1970
Ketchum E. & Co.
Tin plates, bxs., 408
Merch. Dis. Co.
Zinc, pkgs., 5
Macy & Co
Zinc, pkgs., 21
Macy's Josiah Sons,
Zinc oxide, bbls., 50
Meyer G. A. & E.
Zinc oxide, bbls., 165
Zinc oxide, cs., 20
Pennsylvania R.R. Co.
Zinc, pkgs., 34
Phelps, Dodge & Co.
Tin plates, bxs., 7010
Black taggers, bxs., 63
Rogers —,
Zinc, cs., 19
Schneider, Campbell & Co.
Zinc, cs., 2
Simons H.
Brass, case, 1
Steiner, Kahn & Co
Zinc, pkgs., 3
Taylor & Co.
Zinc, pkgs., 5
Tieman & Co.
Zinc, case, 1
Waterbury Clock Co.
Zinc, pkgs., 16
Western Disp Co.
Tin plates, bxs., 1029
Witteman Bros.
Metallic caps, cs., 25
Order,
Tin plates, bxs., 27,970
Tin ingots, 5813
Tin, slabs, 5,00
Antimony, cks., 50
Tin, bdls., 5
Tin, pkgs, 370
Tin sheets, cs., 42

## OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

| | | | |
|---|---|---|---|
| Copper, heavy | ℔ lb. | $0.10½ | @ ..... |
| " light | " | .10 | @ ..... |
| Copper Bottoms | " | .10 | @ ..... |
| Yellow Metal | " | .07½ | @ ..... |
| Brass, heavy | " | .08 | @ ..... |
| " light | " | .07 | @ ..... |
| Composition, heavy | " | .10½ | @ .11 |
| Lead, heavy | " | .03¾ | @ ..... |
| Tea Lead | " | .03¾ | @ ..... |
| Zinc | " | .02½ | @ ..... |
| Pewter, No. 1 | " | .12 | @ ..... |
| " No. 2 | " | .08 | @ ..... |
| Wrought Iron | ℔ ton. | 22.50 | @ ..... |
| Light " | " | 12.00 | @ 13 00 |
| Stove Plate | " | 11.50 | @ 12.00 |
| Machinery " | " | 14 50 | @ 15.00 |
| Grate Bars | " | 4 50 | @ ..... |
| Stereotype Plates | ℔ lb. | .04½ | @ .05 |
| Electrotype " | " | .04¾ | @ .04½ |
| Small Type | " | .05 | @ .05½ |

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

| | | | |
|---|---|---|---|
| Canvas, Linen | ℔ lb. | 3½c. | @ 4 c. |
| White Cotton, New | " | 3½c. | @ ..... |
| " No. 2 | " | 2½c. | @ 2¾c. |
| White, No. 1 | " | 3¾c. | @ 4 c. |
| " No. 2 | " | 1¾c. | @ 2 c. |
| Seconds | " | ½c. | @ 1 c |
| Soft Woolens | " | 5 c. | @ 6 c. |
| Mixed Rags | " | 1¼c. | @ 1¾c. |
| Gunny Bagging | " | 1½c. | @ ..... |
| Jute Butts | " | 1¾c. | @ ..... |
| Kentucky Bagging | " | ..... | @ 3¼c. |
| Book Stock | " | 1¾c. | @ 2 c. |
| Newspapers | " | 1 c. | @ ..... |
| Waste Paper and Scraps | " | ½c. | @ ..... |
| Kentucky Bale Rope | " | 3½c. | @ 4 |

## COAL.

The expected circulars from the Anthracite Coal trade, announcing an advance in prices on September 1, will be issued to-morrow. The Delaware and Hudson Company make an advance of 15¢ on Egg and 25¢ on Stove and Chestnut. Other companies do the same, and in addition advance Grate Coal 10¢. The Philadelphia and Reading Coal and Iron Company have already issued a circular making an advance of 10¢ @ 25¢ ℔ ton in the prices of Coal for Eastern shipment. The only sizes that are not increased in price are Lump, Steamboat and Pea. Stove is advanced 25¢; Broken, 10¢, and Egg and Chestnut, 15¢. All sizes of Brookside Coal will be advanced 25¢ ℔ ton. The Pennsylvania Coal Company initiated, or forestalled, this movement a fortnight ago. In face of a considerable accumulation of Coal at tidewater points near New York, there are many in the trade who consider the September advance ill-advised, declaring that the July and August circulars were virtually a dead letter; that a great deal of Coal contracted for at the old prices has not yet been called for. Trade at present is quiet, but the domestic demand will start about the middle of September, introducing the active season. A year ago there was an advance September 1 of 20¢, and again October 1, 20¢. The following are the prices of the Lehigh and Wilkesbarre Company's Coal, delivered, f.o.b., at Port Johnston, N. J.:

| | Lump. | Broken. | Egg. | Stove. | Chestnut. |
|---|---|---|---|---|---|
| Honey-Brook Lehi | $5.00 | $4.35 | $4.50 | $4.70 | $4.50 |
| Wilkesbarre | 3.90 | 4.00 | 4.30 | 4.70 | 4.50 |
| Plymouth Red Ash | ..... | 4.25 | 4.50 | 5.25 | 4.75 |

Last week's Anthracite production is estimated at 699,092 tons, the largest week for nearly a year, and 113,750 tons larger than the corresponding week of 1882. The total output so far is 18,304,052 tons, an increase of 1,288,385 tons. There is no probability of further restriction during the remainder of the season.

Bituminous Coal is dull and cheap.

## PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Aug. 28, 1883.

**Pig Iron.**—The dullness reported for several weeks past shows no abatement, and business is about as quiet as it can be. This remark applies to the demand, consumption being about as it has been all through the year. It is somewhat difficult, therefore, to account for the unusually limited demand. Prices cannot go lower if consumption keeps up, and as production has already been cut down pretty sharply, there is no reason for expecting supplies to increase. On the contrary, there must be either a falling off in consumption or an increasing disproportion between supply and demand. Whether it is that consumers expect a falling off in the demand for their products or not, cannot be clearly ascertained, but they will not buy for forward delivery, although prices are admittedly as low as any one wants to see them. The probability is that the demand for manufactured articles, like the demand for raw material, is of a hand-to-mouth character; it may continue, and it may not; hence, all through the various departments, buyers take what they know they require, but beyond that they prefer taking their chances of the market—the immediate dullness serving to confirm their ideas in this respect. Predictions in regard to the future, therefore, would be extremely risky at a time like the present, but, taking into account the comparatively small supply of really good Irons, the important curtailment of production, and, in spite of dull markets, the very considerable consumption which is steadily maintained, it is difficult to see how prices can be any lower, and some think there may yet be a slight improvement before the year closes. Choice Foundry Irons are still pretty well held, although in some cases slight concessions would probably be made on firm offers for good sized lots. No. 2 is decidedly dull; prices weak and irregular, especially on the common qualities. Mill Irons are in active demand at low prices, and while there is a slight accumulation of such of the better grades as are held at high figures, others, which have been available at $17.50 and less, have been gradually picking up, until there is now somewhat of a scarcity. The range of prices for small lots has been about as follows: No. 1 Foundry, delivered, $22 @ $23; No. 2 do., $20 @ $21; Gray Forge, $18.50 @ $20, with sales of all the various grades, in exceptional cases, at slightly lower rates, according to quantity, quality and delivery.

**Muck Bars.**—The market is somewhat more active, a considerable business having been done during the week at prices ranging from $33.50 to $34, at mill. Market steady.

**Blooms.**—There is very little doing, but sales are still made at about last week's rates, viz.: Charcoal Blooms, $57 @ $58; Run-out Anthracite, $47.50 @ $49; Scrap Blooms, $42 @ $44; Northern Ore Blooms, $39.50 @ $41.50.

**Bar Iron.**—There is very little to report in the Finished Iron trade, demand and supply being about in equal proportion. Prices are steady, although, if buyers were to offer large orders of desirable specifications, it is not unlikely that efforts would be made to secure the business, even though it might involve some shading in prices. So far the mills have had about all the orders they have been able to manage, but with cooler weather production may be expected to increase, and unless orders increase in proportion, prices may weaken a little, although at present 2.15¢ @ 2.2¢ is the usual rate for the general run of orders, 2.1¢ being a bottom figure to the most desirable class of buyers. Skelp Iron has been in fair demand, several hundred tons having been sold at about 2.15¢, delivered, with 2.1¢ bid for more.

**Plate and Tank Iron.**—The demand for all kinds of Plate Iron, in lots of 50 to 200 tons, continues without abatement. Orders would be freely taken at current rates for October delivery, but buyers take only what they want for spot delivery, having no fear of higher prices, with some little possibility of being able to do better later on in the season. Prices are about as last quoted, viz.: Tank Iron, 2.5¢; Boat Plate, 2.35¢ @ 2.4¢; Shell, 3¢ @ 3.25¢; Flange, 4¢ @ 4.25¢, and Fire-Box, 5¢ @ 5.5¢.

**Structural Iron.**—Nothing new on the market, but there is a good deal of activity in finishing up old orders, which for the time being keep manufacturers fully employed. Prices are nominally as last quoted, but there is a sharp competition for new business, and for good-sized lots it is not unlikely that buyers would obtain better terms than could have been had two or three weeks ago, say as follows: Angles, 2.3¢ @ 2.4¢; Bridge Plates, 2.4¢ @ 2.5¢; Tees, 2.8¢ @ 3¢, and Beams and Channels, 3.5¢.

**Sheet Iron.**—Demand continues satisfactory, and for the higher numbers prices are firmly maintained. The outlook is favorable, and there is no reason to expect anything but a steady trade at quotations as below for ordinary sized lots, say:

| | |
|---|---|
| Common Sheets, No. 28 | 4½¢ |
| Common Sheets, Nos. 26 and 27 | 4¼¢ |
| Common Sheets, Nos. 21 to 25 | 4 ¢ |
| Common Sheets, Nos 18 to 20 | 3¾¢ |
| Best Refined, ¼ ℅ advance on the above. | |
| Best Bloom Sheets, Nos. 26 to 28 | 6½¢ |
| Best Bloom Sheets, Nos. 22 to 25 | 6¼¢ |
| Best Bloom Sheets, Nos. 16 to 21 | 6 ¢ |
| Common Red Plates, 3-16 to 16 | 2.7¢ |
| Best Bloom, Galvanized, discount | 40 ℅ |
| Second quality, discount | 50 ℅ |

**Wrought-Iron Pipe.**—A few large orders have been on the market, but competition for such is very close, and in consequence prices rule irregular. Taking the market all round, the demand is fair. We quote as follows: 60 ℅ off list price on Boiler Tubes, and 70 and 5 ℅ off on Gas and Steam Pipe. We hear of higher discounts, but circumstances were somewhat exceptional.

**Steel Rails.**—There seems to be more inquiry, but no large amount of business has been placed, so far as we can learn. Buyers of large lots appear to be holding off in expectation of special inducements being offered to them, but as yet manufacturers have shown no signs of weakening. Firm offers at $37 @ $37.50 might be accepted for winter work, but sellers are not disposed to lower their rates without some assurance that the parties are ready to buy; hence the "stand off" on both sides. It is understood that business could be done at $36 @ $36.50, but so long as the mills can find employment, as at present, and there are no direct offers at less money, they are hardly likely to name figures much below $38. A good demand for small lots is reported, and sales have been chiefly at $38 @ $38.50 at mill, and upward, for light Rails.

**Old Rails.**—Ts are very scarce, $23.50 @ $24 asked for lots to arrive, $23 bid. Spot lots would probably command $23.50, but we cannot hear of such lots being available. A sale of Bridge Rails was made at $25.50, Philadelphia, which price is also bid for Double Heads, to arrive.

**Scrap Iron.**—Market rather quiet, but with light supplies prices are steady at $23 @ $23.50 for cargo lots, and $24 @ $25 for choice yard lots.

**Nails.**—The market remains unchanged There is a continued good consumptive demand, and prices are firm at $3, with slight concessions on large orders.

## PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, PA., Aug. 28, 1883.

There has been a lull in the general Iron trade during the past week. Not only has the demand for the raw article fallen off, but the market is weaker, with increased offerings and less disposition to buy. Various causes are assigned for this apparent reaction, among the most probable being the recent failures reported in different parts of the country and the demoralized condition of the stock market. There is no reason to believe, however, that the dullness in the trade will last long, in view of the fact that money is plentiful and that good crops are assured. All that is needed is a return of confidence, which has been badly shaken by recent happenings. There will be at least an average fall trade in all kinds of manufactured goods, as stocks in the hands of jobbers are known to be comparatively light. It is worthy of mention that with very few exceptions the Iron and Steel mills and blast furnaces in this vicinity are in operation, though some are not working up to their full capacity.

**Pig Iron.**—Business has been remarkably dull during the past week, and while prices remain unchanged, the tone of the market is weaker. Brokers report that consumers are now disposed to hold back, refusing to buy beyond immediate actual wants. A number of the mills, however, are pretty well stocked, having bought freely within the past few weeks under the impression that there might be an advance. The position of the market has changed in this important respect—that with fewer buyers there are more sellers, and the offerings by outside furnaces are on the increase. Consumption is large, however, as the puddling furnaces are nearly all in operation, and stocks will soon have to be replenished. Our home furnaces are sold from 30 to 60 days ahead. We repeat former quotations:

| | | |
|---|---|---|
| No 1 Foundry | $21.00 @ $21.00, | 4 mos. |
| No. 2 " | 19.00 @ 20.00, | 4 " |
| Neutral Mill | 17.50 @ 18.00, | 4 " |
| All-Ore Mill | 19.00 @ 20.00, | 4 " |
| Charcoal Warm-Blast | 25.00 @ 27.00, | 4 " |
| " Cold-Blast | 28.00 @ 31.00, | 4 " |
| Bessemer Iron | 21.00 @ 21.50, | 4 " |

For large lots of Bessemer Iron quotations may be fairly given at $20.50, cash, @ $21, 4 mos., several large sales having been made at these prices a few weeks ago; in a small way, $21, cash, @ $21.50, 4 mos. Some of the furnaces having Bessemer contracts will be out of the market for two to three months.

**Muck Bar**—Is weaker and lower; the latest sales reported were at $33.50 @ $33.75, cash, at mill, which is certainly low, present cost of Pig Iron considered.

**Manufactured Iron.**—There is a fair degree of activity; the mills are all in operation, though some have but few orders on their books. There is a very general complaint in regard to prices, particularly as regards the ordinary makes of Merchant Iron, which, under the most favorable circumstances, yield a very small margin for profit. We continue to quote on a basis of 1.9¢ @ 2¢ for Bars, 60 days, 2 ℅ off for cash.

**Nails.**—There has been but little change in the situation since our last report; trade is still reported slow for the season, which may be attributed in large part to the refusal of jobbers and other large dealers to order beyond their immediate wants, in expectation of lower prices. The probability is that there will be a largely improved demand next month, as stocks are known to be light both in hands of jobbers and consumers, and the consumption promises to be large during the next three months. We continue to quote at $3, 60 days, 2 ℅ off for cash, with usual abatement of 10¢ ℔ keg on carload lots and upward.

**Wrought-Iron Pipe.**—The situation remains unchanged; there is a fair business, but prices continue very unsatisfactory. The mill at Reading is reported as having shut down, and it is probable that others will do so soon, unless there is a change for the better in the meantime. The Pipe trade has been exceedingly unsatisfactory all this year. We continue to quote discounts on Gas and Steam Pipe at 70 and 10 ℅ on small, and 75 ℅ on large sizes, and 57½ @ 60 ℅ on Boiler Tubes. Oil-Well Casing, nominal, at 43¢ @ 45¢ ℔ foot, net; do. Tubing, 14¢ @ 15¢.

**Steel.**—A fair business is reported in Merchant Steel, with prices unchanged, as follows: Best brands Refined Cast Steel, 11¢ @ 12¢; do. Crucible Machinery, 6¢ @ 7¢; Open-Hearth and

## LOUISVILLE.

GEO. H. HULL & Co., Commission Merchants, report as follows, under date of Aug. 25, 1883: The market is quiet, but some large transactions have been made at a shade under current quotations. Most furnaces are holding firm and asking an advance for future delivery.

| | |
|---|---|
| FOUNDRY IRONS. | |
| No. 1 Hanging Rock Charcoal | $25 00 @ 25.50 |
| No. 1 Southern Charcoal | 22.50 @ 23.00 |
| No. 1 Hanging Rock Stonecoal and Coke | 20.50 @ 22.50 |
| No. 1 Southern Stonecoal and Coke | 20.00 @ 20.50 |
| No. 2 " " " | 18.50 @ 19 50 |
| "American Scotch" | 19.00 @ 21.00 |
| Open Silver-gray | 18.00 @ 19.00 |
| Close " | 17.00 @ 18.00 |
| MILL IRONS. | |
| No. 1 Charcoal | 19.00 @ 20.00 |
| No. 1 Stonecoal and Coke. Neutral | 18.00 @ 18.50 |
| No. 2 " " | 17 00 @ 17.50 |
| No. 1 " " Cold-short | 17.00 @ 17.50 |
| No. 2 " " " | 16.50 @ 17.00 |
| White and Mottled, Cold-short and Neutral | 15.00 @ 16.00 |
| CAR WHEEL IRONS. | |
| Hanging Rock, Cold-blast | 30.00 @ 33 00 |
| " Warm-blast | 23 00 @ 24.00 |
| Alabama and Georgia, Warm and Cold-blast | 27.00 @ 28.00 |
| Central Kentucky, Cold-blast | 27.00 @ 28.00 |

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 115 to 121 West Main street, report to us as follows, under date of August 25, 1883: The market is devoid of new features, except such as are produced by local causes. Low water in the Ohio River has shut off navigation above Ironton and seriously interfered with it below. Light-draft boats have been put on, whose loads are necessarily small and time irregular. Railroads never seem prepared to take advantage of the harvest they might reap by providing cars and expediting delivery. Eight to ten days from Pittsburgh and Wheeling is not unusual, whereas the packets come through in three to four. *Bar Iron*—Firm and selling freely. The mill here is closed temporarily. Manufacturers complain that finished product keeps low, while raw material has in some cases been advanced. *Nails*—Scarce and firm. The mills are again in operation, and, as many of them have increased their capacity, we look for a plentiful supply later. General trade is good; the principal difficulty is the unsettled market that combinations make in their effort to advance prices fictitiously. Two weeks ago an advance on Hoes was announced. Now, we are told that, while Forks and Rakes will be held strong, Hoes are out, and the intimation is that they will be low enough.

## CINCINNATI.

AUGUST 27, 1883.—*Pig Iron.*—The market during the past week has shown some new features. Bids for deliveries through the coming 6 to 12 months of round lots of middle and better grades have been accepted by owners at a small concession from former quotations of Charcoal Coke and Stonecoal makes. Statistics of stocks in first hands and the output of furnaces in this region—Alabama, Tennessee and Virginia, August 15—show an important increase of quantity over the report of May 15, and this, in the face of the fact that the consumption has been largely increased since May, leads the holders of Pig to be less stringent in their views as to prices and time of future deliveries. Sales in the past week justify following quotations:

| | |
|---|---|
| Best Hanging Rock Charcoal Foundry | $24.00 @ 24.50 |
| Good No. 1 Hanging Rock Charcoal Foundry | 23.50 @ 24.00 |
| Good No. 2 Hanging Rock Charcoal Foundry | 22.00 @ 22.50 |
| Best No. 1 Hanging Rock Coke Foundry | 22.00 @ ..... |
| Good No. 1 Hanging Rock Coke Foundry | 21 00 @ 21.50 |
| No. 2 Hanging Rock Coke Foundry | 20 50 @ 21.00 |
| Best No 1 American-Scotch | 20.50 @ 21.00 |
| No. 2 American-Scotch | 19.50 @ 20.00 |
| No. 1 Silver-gray Softeners | 20.00 @ 20.50 |
| No. 2 " " | 19.00 @ 19 50 |
| No. 3 " " | 18.50 @ ..... |
| Cold-blast Hanging Rock Charcoal Car-Wheel Iron | 30.00 @ ..... |
| Warm-blast Hanging Rock Charcoal Car-Wheel Iron | 25.00 @ 26.00 |
| Southern Cold-blast Charcoal Car-Wheel Iron | 28 00 @ ..... |
| Southern Warm-blast Charcoal Car-Wheel Iron | 26.00 @ 27.00 |
| No. 1 Southern Hot-blast Charcoal Foundry | 21.00 @ 2.00 |
| No. 2 Southern Hot-blast Charcoal Foundry | 19.00 @ 20.00 |
| No. 3 Southern Hot-blast Charcoal Foundry | 18.50 @ ..... |
| No. 1 Southern Hot-blast Coke Foundry | 19 50 @ 20.00 |
| No. 2 Southern Hot-blast Coke Foundry | 18.50 @ 19.50 |
| Southern Hot-blast Coke Forge | 17.50 @ 18.00 |

## BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of August 27, 1883: Business for the past week has ruled rather less active than for several months past; this, however, is readily accounted for, being incident to this season of the year. Values seemingly are somewhat more firm, and doubtless will assume increased stiffness with the approaching cooler weather.

| | | | |
|---|---|---|---|
| Ref. Bar Iron, 1 to 6 x ½ to 1 | ₩ lb | 2¼ @ | 2.35¢ |
| " " 1 to 4½ x 1½ to 1 | ₩ lb | 2¼ @ | 2.35¢ |
| " " ¾ to 2, Round and Square | ₩ lb | 2¼ @ | 2.35¢ |
| Hoop Iron, 1½ wide and upward | " | 3 2-10 @ | 3 3-10¢ |
| Band Iron, from 1½ to 6 in. wide | " | 2 7-10 @ | 2 8-10¢ |
| Horse-shoe Iron | " | 3¾ @ | 3¾¢ |
| Norway Nail Rods | " | 5¼ @ | 5¼¢ |
| Black Diamond Cast Steel | " | 11 @ | 12 ¢ |
| Machinery Steel | " | 4½ @ | 5 ¢ |
| Spring Steel | " | 4 @ | 4½¢ |
| Common Horse Nails | " | 10 @ | 11 ¢ |
| Railroad Spikes, 5½ x 9-16 | " | 2 6-10 @ | 2 7-10¢ |
| Perkins' Horse Shoes, ₩ keg of 100 lb | | | $4 37½ |
| " Mule Shoes | | | 5 37½ |

R. C. HOFFMAN & Co., Pig and Railroad Iron Merchants, No. 21 South Frederick street, writes as follows, under date of August 28, 1883: We have no change to note in the Pig-Iron market since our last report. Sales light and prices without material change. We quote as follows:

| | |
|---|---|
| Baltimore Charcoal Wheel Iron (all Baltimore Ore) | $28.00 @ 30.00 |
| Virginia C. B. Wheel Iron | 28.00 @ 30.00 |
| Anthracite, No. 1 | 22.00 @ 24 00 |
| " No. 2 | 20.00 @ 22.00 |
| " No. 3 | 17.00 @ 19.00 |
| " Mottled and White | 15.00 @ 16.00 |
| Charcoal C. B Blooms | 50.00 @ 57.00 |
| Refined Blooms | 40.00 @ 45.00 |

## ST. LOUIS.

HOFFER & Co., Pig Iron and Iron Ore Merchants, 214 Pine street, report to us as follows, under date of August 25, 1883: Contrary to expectations, there has thus far been no revival in the Iron business in this market. The fact that the quantity of Pig Iron in store was greater in July than in January, notwithstanding the large number of furnaces out of blast in the interval, seems to have paralyzed business. We continue quotations.

| | |
|---|---|
| HOT BLAST CHARCOAL IRONS. | |
| Missouri | $20.00 @ 20.50 |
| Southern | 20.00 @ 21.00 |
| Ohio | 25.00 @ 26.00 |
| COAL AND COKE IRONS. | |
| Missouri | 20.00 @ 20.50 |
| Southern | 18.50 @ 20.00 |
| Ohio | 20.00 @ 25.00 |
| MILL IRONS. | |
| Red Short | 18.50 @ 20 00 |
| Neutral | 17.00 @ 18.00 |
| CAR WHEEL AND MALLEABLE IRONS. | |
| Missouri | 21.00 @ 22.00 |
| Southern | 25.00 @ 28.00 |
| Ohio | 23.00 @ 32.00 |

# Our English Letter.

### Review of the British Iron, Steel, Metal and Hardware Trades.

*(From Our Regular Correspondent.)*

LONDON, August 13, 1883.

THE IRON MARKET

has been entirely free from other than very commonplace features during the week, which has been a good deal broken by the bank holiday and the beginning of the customary seaside holiday season. At Glasgow the market has ruled quiet, and there has been a limited business only in warrants, which have lost on the week, and closed yesterday at 47/1 ₩ ton. Makers' brands of Scotch pig are steady at late rates, and are said to be in good request. Shipments continue on a fair scale, but are better coastwise than to foreign destinations, as compared with last year to date. At Middlesboro' prices are virtually unchanged at 39/ @ 39/6 for No. 3, although the makers hold out for rather more money. The returns for July show that the stocks were reduced by about 4000 tons only, which is less than had been expected, just as the total of the month's shipments also did not fulfill the anticipations formed respecting them. The local consumption is healthy and large. On the West Coast there has been no change in hematite ores or pig iron, the former being in oversupply and largely stocked at 9/ @ 11/ at the mines, while mixed parcels of pigs meet with few new orders at 49/ @ 50/ ₩ ton. Shipments are still on a considerable scale, but are in completion of old contracts. Several furnaces have been stopped, but the 53 still at work appear to turn out more iron than is being sold, and the stock is increasing. Elsewhere crude irons may be termed nominal at late rates, although deliveries to the Staffordshire works have been resumed, and have to some extent relieved stocks in ironmakers' yards. On all sides, however, there are evidences of a too plenteous production; hence there appears to be no probability whatever of any early stiffening of selling values. Heavy manufactured iron is without change, and is still in large output, but is easier for long-dated future deliveries. Fencing and other wire is weak, and we hear of sales at remarkably low prices, albeit the majority of makers have made no official alterations in their quotations. For galvanized sheets there is a steady call, but we do not hear of any particular pressure, while, on the other hand, the competition of venders seems to be constantly increasing.

In merchant iron the most satisfactory feature of the week is the news that the ironworkers' strike in South Staffordshire has totally collapsed. It would be "whipping a dead horse," and a mere waste of time and space, to reiterate my opinion of the conduct of the men in this matter, but it is a matter for congratulation that the employers should have been enabled to vindicate their position. They will be wise to proceed very cautiously in mapping out the future, but, so far as I can see, they cannot do better than adopt the sliding-scale idea as the groundwork of the new arrangements. Marked bars are steady at £7. 10/, with common bars at all sorts of prices down to £5. 7/6 for ordinary Welsh. Sheets are in good request at £8 for galvanizing singles, and £8. 10/ for doubles, with working up, and other sheets *pro rata*. Hoops and strips are quiet. Iron rails are quiet, and in slow request, while old rails meet with a moderate home demand for rerolling purposes, but are not wanted for export. For heavy wrought scrap-iron £3. 3/, c.i.f. New York, is offered, but not accepted by holders. Cast scrap is nominal at £37. 6/ and thereabouts. Freights are still nominal, and rather easy. Pig iron by ordinary steamer from Glasgow to New York is called 5/ @ 7/6 ₩ ton. For the Cape Colonies very little is doing, markets for most goods being glutted, and the general want of confidence not tending to improve matters. In India and China freights there is not much alteration, supply of tonnage being regulated to demand, which is very restricted. To the United States and Canada a fair trade is being done at low rates of freights—the effect of Continental competition. Generally, there appears to be a marked falling off in the carrying trade from London, a large quantity of goods which formerly came here in transit being now shipped direct from foreign parts. There is nothing whatever doing in Bessemer blooms for export, and no inquiry for old railway leaf-spring steel. For single-sawn rail crop ends there is only a weak demand; double-sawn D. H. are wanted, and firm in price. I am not able to state the facts, if they are such, on my own knowledge, but I hear that crop ends of basic steel are very difficult to deal with for rerolling purposes. *Verb. sat sap.* In

STEEL RAILS

there has been something of a commotion during the week, owing to prolific rumors regarding the alleged acceptance of prices which are said to be infinitely below anything recently spoken about in public. First of all, a lot of 25,000 tons for one of the home railways was said to have been offered all round, and to have been secured by Barrow at a figure about 8/ below the close offer of a Sheffield house (Steel, Tozer & Hampton), which was regarded as a demonstration of the marked inability of the works inland to compete with those situated on the coast. This was bad enough, but worse was still to come, as it did come from the Brussels 'Change meeting last Wednesday. The rail men there gave currency to a report (in which they professed entire belief) that some English house had taken an order for 50,000 tons of steel rails at £4 per ton! This report completely "knocked over" the Belgians, who said they could not pretend to make rails at the price. At the Liège 'Change meeting on Friday the same rumor was current, save that the quantity was definitely stated to be 88,000 tons, the destination India, and the successful tenderers, Charles Cammell & Co., of Sheffield. This appeared so very circumstantial that the report gained general credence. The story is somewhat spoiled by the statement "most emphatically" made by your contemporary, *The Ironmonger*, that "Messrs. Cammell have not sold any rails on Indian account for many months past, nor are they now treating for any such contract." That is a straightforward sort of contradiction of the report as it now stands, but there remains a very general impression that "there is something in it" after all. The names and details may have been wrongly given, but that a large quantity of rails has been sold at an unusually low price is fairly evident. It is no doubt a little difficult to ascertain "bottom facts" in such cases and under these circumstances, but the truth, like murder, will out, and it is probable that in my next letter I shall be enabled to tell you more on the subject. I happen to know that at least one concern is making no profit at £5 ₩ ton, so that £4 ₩ ton must either represent a gigantic loss or the works concerned must be in a specially advantageous position all round.

THE BOARD OF TRADE RETURNS

for the month of July, just issued, are not so favorable as had been anticipated. They show that the imports last month were of the total value of £34,320,066, against £34,659,779 in July, 1882. The exports were of the aggregate value of £20,817,724, compared with £21,374,978 in the same month last year. The total quantity of iron and steel exported was 361,414 tons, valued at £2,404,333, as against 403,333 tons and £2,943,192 in July, 1882, and 356,422 tons, worth £2,611,452 in July, 1881.

Among the chief items on the export side of the account are the following:

| Articles. | Quantities. 1882. | Quantities. 1883. | Values. 1882. | Values. 1883. |
|---|---|---|---|---|
| Firearms, No. | 18,053 | 20 236 | £25,280 | £30.743 |
| Copper, unwt., cwts. | 23,926 | 25,601 | 84 717 | 86,417 |
| Copper wrt., cwts. | 21,669 | 25,909 | 89,052 | 100,663 |
| Mixed or yellow metal sheathing, cwts. | 31,889 | 30,933 | 90.179 | 94.046 |
| Coal, &c., tons | 2,004.729 | 2,140,660 | 8 2,074 | 969,558 |
| Hdw. and cutlery | ..... | ..... | 551,415 | 310,939 |
| Pig iron, tons | 162,921 | 155,004 | 459,467 | 410,071 |
| Bar, angle—bolt and rod | 23,978 | 22,462 | 174,619 | 156,426 |
| Iron rails, tons | 2,117 | 2,279 | 15,256 | 14,753 |
| Steel rails, tons | 74,878 | 64,071 | 493,550 | 377,857 |
| Railroad of all sorts, tons | 90,877 | 84,750 | 627,095 | 520,931 |
| Wire (except tel. wire), galvanized or not, tons | 31,245 | 29,063 | 372,418 | 367,214 |
| Hoops, sheets, and boiler plates, tons | 31,245 | 29,063 | 372,418 | 367,114 |
| Tin plates, tons | 28,554 | 24 816 | 480,172 | 424,188 |
| Cast or wro't, tons | 30,283 | 26,597 | 4 0,165 | 345,991 |
| Old, for remanufacture, tons | 10,967 | 8,026 | 40,237 | 24,383 |
| Steel, unwr'ght, tons | 15,273 | 4,350 | 176,449 | 112,235 |
| Man'factures of steel and iron, tons | 1,127 | 673 | 78,955 | 31,799 |
| Lead—Pig, rolled sheet, piping and tubing, tons | 3,522 | 4,049 | 83 8.0 | 15,535 |
| Steam engines | ..... | ..... | 357 471 | 458,037 |
| Other descriptions of machinery and mill work | ..... | ..... | 737,048 | 7.3,801 |
| Plate and plated and gilt wares | ..... | ..... | 23,528 | 27,724 |
| Tel. wire and apparatus connected therewith | ..... | ..... | 25,890 | 36,505 |
| Tin (unwrt.), cwts. | 12,592 | 10,191 | 63,371 | 49,884 |
| Zinc or spelter, cwts. | 18,093 | 12,091 | 11,328 | 8,812 |

The principal articles of import were:

| July. | Quantities. 1882. | Quantities. 1883. | Values. 1882. | Values. 1 83. |
|---|---|---|---|---|
| Copper ore, tons | 16,838 | 10,472 | £138,735 | £87,635 |
| Copper regulus and precipitate, tons | 4,836 | 3,752 | 142.911 | 118,490 |
| Copper, unwrought and part wrought, tons | 3,111 | 2,960 | 215,207 | 197,895 |
| Iron ore, tons | 341,117 | 391,785 | 350,843 | 263,410 |
| Bar, angle, bolt and rod, tons | 14,765 | 14,943 | 156,610 | 148,383 |
| Iron manufactures, unenumer'd, cwts. | 269,681 | 332,980 | 188,644 | 255,713 |
| Steel, unwrought, tons | 363 | 423 | 3,899 | 4,831 |
| Lead, pig or sheet, tons | 7,304 | 9,305 | 105,877 | 118,866 |
| Pyrites, tons | 43,904 | 47,792 | 119,592 | 106,267 |
| Quicksilver, lbs | 36,900 | 1,309,935 | 2,800 | 100,491 |
| Elephants' teeth, cwts | 849 | 1,267 | 40.022 | 48,706 |
| Tin in blocks, ingots, bars or slabs, cwts. | 22,096 | 29,107 | 112,021 | 137,425 |
| Zinc, crude, in cakes, tons | 3,612 | 3,091 | 61,346 | 47,523 |
| Zinc, manufactures of, unenumerated, cwts. | 35,961 | 38,876 | 38,539 | 36,188 |

THE PRICES PAID BY THE UNITED STATES

include the subjoined, which cover all the articles to which it is practicable to arrive at such averages, ₩ ton:

| | £ | s. | d. |
|---|---|---|---|
| Pig iron | 3 | 7 | 6 |
| Old iron (scrap) | 2 | 16 | 5½ |
| Unwrouget steel | 28 | 18 | 10½ |
| Tin plates | 16 | 18 | 11¼ |
| Iron rails | None. | | |
| Steel rails | 5 | 1 | 10½ |

TO THE UNITED STATES

the leading exports last month were:

| Articles. | Month of July, 1883. | Month of July, 1882. | Month of June, 1883. |
|---|---|---|---|
| Alkali, cwts | 212,086 | 291,876 | 275,733 |
| Hardware and cutlery, £ | 40,547 | 47,303 | 35,466 |
| Iron—Pig, tons | 35,028 | 36,357 | 24,659 |
| Bar, angle, rod, &c., tons | 314 | 893 | 535 |
| Railroad, all, tons | 5,749 | 18,581 | 3,590 |
| Hoops, sheets, plates, &c., tons | 4,547 | 5,631 | 2,684 |
| Tin plates, tons | 20,158 | 23,941 | 17,710 |
| Cast or wrought, tons | 132 | 530 | 628 |
| Old, tons | 3,080 | 6,106 | 8,948 |
| Steel, unwrought, tons | 1,131 | 11,359 | 3,884 |
| Lead, all sorts, tons | ..... | 2 | 1 |
| Steam engines, £ | 3,550 | 1,105 | 5,268 |
| Other machinery, &c, £ | 29 671 | 44,145 | 75,179 |
| Tin, unwrought, cwts | 201 | 423 | 242 |
| Special return—Iron rails, tons | ..... | 46 | 100 |
| Steel rails, tons | 5,747 | 18,200 | 5,281 |

SCOTCH PIG IRON

has been quiet since I last wrote, and warrants have gone back a few pence on the week, although the general condition of trade in Scotland is sound and brisk, and shipments are on a free scale. Makers' brands have remained very steady, which makes the position of warrants the more anomalous, inasmuch as the rise in fuel should affect both departments to an equal extent. There are now 115 furnaces in blast, against 110 last year this date, while Connal's stores contain 584,438 tons, as compared with 631,945 tons a year back. The stocks increased by 395 tons last week. Up to date this year shipments have been 381,203 tons, or 2109 tons above last year to same date. Imports of Middlesboro' pig iron into Scotland have reached 159,324 tons, or an increase of 27,259 tons. Writing from Glasgow, on August 11, James Watson & Co. said: "The Scotch iron market has been flat this week, with a moderate business done at lower prices. Makers' iron has not been much inquired for, and in some instances prices are a shade easier. The Middlesboro' market is inanimate, and very little fresh business is reported. On Monday the market was closed, owing to the bank holiday. On Tuesday the price of warrants receded from 47/6½ to 47/4, cash, and on Wednesday the fall continued to 47/1 ₩ ton. Yesterday a moderate business was done from 47/2 to 47/, and to-day as low as 46/10½ was accepted, closing with buyers at 47/½, sellers near. The shipments last week were 13,722 tons, as compared with 13,379 tons for the corresponding week of last year." We quote:

| | No. 1. | No. 3. |
|---|---|---|
| G. M. B., at Glasgow | 48/6 | 46/ |
| Clyde, " | 50/6 | 48/6 |
| Coltness " | 61/ | 53/ |
| Langloan, " | 60/ | 53/ |
| Gartsherrie, " | 57/ | 51/ |
| Summerlee, " | 57/ | 51/ |
| Calder, " | 57/6 | 50/6 |
| Carnbroe, " | 55/ | 49/ |
| Glengarnock, at Ardrossan | 55/ | 48/ |
| Eglinton, " | 49/ | 45/6 |
| Dalmellington " | 49/6 | 48/6 |
| Shotts, at Leith | 59/6 | 55/ |
| Kinneil, at Bo'ness | 49/ | 47/6 |
| Carron, at Grangemouth | 49/ | 47/6 |

MIDDLESBORO' PIG IRON

is still weak and flabby, both the Board of Trade returns and the Cleveland ironmasters' statistics having been of a character favorable to the bear operators. Shipments are still large, and the local consumption is good, but the market has no "grit," and No. 3 has receded a point or two, being now offered by merchants at 39/ @ 39/3 and 39/6, despite the strenuous efforts of the smelters to maintain their range of 39/6 @ 40/. G. M. B. f.o.b at wharves in Tees, net cash, less 2½ %, are:

| | | | |
|---|---|---|---|
| No. 1 Foundry | 41/ | Mottled | 37/6 |
| " 2 " | 41/ | White | 37/ |
| " 3 " | 39/ | Refined Metal | 55/ |
| " 4 " | 38/6 | Kentledge | 40/ |
| " 4 Forge | 38/ | Cinder | 34/ |

WEST COAST HEMATITES

are still without alleviating features, and are very slow of sale, even at the low rates now and lately obtaining. For mixed parcels, 49/ @ 50/ is quoted, and makers' brands are:

| | No. 1. | No. 2. | No. 3. |
|---|---|---|---|
| Cleator | 51/ | 54/ | 53/6 |
| Lonsdale | 51/ | 50/6 | 50/ |
| Workington | 51/ | 50/6 | 50/ |
| Lowther | 51/ | 50/6 | 50/ |
| Distington | 51/ | 50/6 | 50/ |
| Harrington | 51/ | 50/6 | 50/ |
| Solway | 51/ | 50/6 | 50/ |
| Maryport | 51/ | 50/6 | 50/ |

The ore raisers are still stocking in Cumberland, but the Furness mines are selling more freely at 9/ @ 11/ ₩ ton. Spanish ores, 54 %, are called 13/ @ 14/ ₩ ton ex ship, and are in poor request. Last week's shipments from the West Coast ports included 19,079 tons of Bessemer and hematite pig iron, and 4389 tons of steel rails. There are now 49,000 tons in the West Cumberland stores.

THE CLEVELAND IRONMASTER'S RETURNS

for July are set out in the official statistics of Mr. Dennington, the secretary, to whom I am indebted for the figures, which are as below:

MAKE OF PIG IRON.

| | 1883. July. Tons. | 1883. June. Tons. | Increase. Tons. | Decrease. Tons. |
|---|---|---|---|---|
| Cleveland pig, port of Middlesboro' | 125,392 | 121,430 | 3 962 | .... |
| Cleveland pig, outside | 30,288 | 31,267 | .... | 979 |
| Clevelandpig, whole district | 155,680 | 152,697 | 2,983 | .... |
| Other kinds, including hematite, spiegel and basic pig iron, whole dis't | 75,504 | 73,284 | 2,220 | .... |
| Total of all kinds, whole district | 231,184 | 225,981 | 5,203 | .... |
| Furnaces on Cleveland pig iron at end of month, whole district | 85 | 84 | 1 | .... |
| Furnaces on hematite, &c., at end of m'nth, whole dis't | 33 | 33 | .... | .... |
| Total | 118 | 117 | 1 | .... |

STOCKS OF PIG IRON.

| | 1883. July 31. Tons. | 1883. June 30. Tons. | Increase. Tons. | Decrease. Tons. |
|---|---|---|---|---|
| Makers' stocks of Cleveland pig, p'rt of Middlesboro' | 128,326 | 140,656 | ..... | 12,330 |
| Makers' stocks of Cleveland pig outside of Middlesboro' | 42,226 | 40,981 | 1,245 | ..... |
| Makers' stocks of Cleveland pig, whole district | 170,552 | 181,637 | ..... | 11,085 |
| Makers' stores of Cleveland pig, whole district | 21,812 | 12,650 | 8,162 | .. |
| Pig iron in public stores: | | | | |
| The N. E. R. Co.'s stores | 4,210 | 4,350 | ..... | 140 |
| Connal's stores | 73,667 | 75,457 | ..... | 1,790 |
| Total | 270,241 | 275,094 | ..... | 4,85 |

SHIPMENTS OF PIG IRON FROM PORT OF MIDDLESBORO'.

| | 1883. July. | 1883. June. | 1882. July. | Inc. on July, 1882. | Dec. on June 1883. |
|---|---|---|---|---|---|
| | Tons. | Tons. | Tons. | Tons. | Tons |
| Shipments foreign | 49,015 | 56.612 | 39,385 | 9,630 | 7.597 |
| Shipments coastwise | 36 202 | 37,542 | 34 926 | 1,276 | 1,340 |
| Total | †85,217 | *94,154 | 74,311 | 10,006 | 8.937 |

† Including 581 tons of pig iron other than "Cleveland."

* Including 1904 tons of pig iron other than "Cleveland."

SOME CURRENT PRICES

are as given below:

| | £ | s. | d. |
|---|---|---|---|
| COPPER. | | | |
| Burra Burra cake, in warehouse, ₩ ton | 68 | 0 | 0 |
| Wallaroo " " " | 68 | 10 | 0 |
| Braziers' sheets, 4 x 4, ₩ ton | 75 | 0 | 0 |
| Ordinary " (other sizes) and bolts, ₩ ton | 75 | 0 | 0 |
| Ordinary locomotive plates and bolts, ₩ ton | 76 | 0 | 0 |
| Rolled flat bottoms for Egypt, &c., ₩ ton | 78 | 0 | 0 |
| Tough cake and ingot, ₩ ton | 67 | 0 | 0 |
| Best selected ingot, ₩ ton | 69 | 0 | 0 |
| Copper wire to 20 W. G., ₩ lb | 0 | 0 | 9¼ |
| " nails, ₩ cwt | 0 | 86 | 0 |
| " telegraph wire to 20 W. G. ₩ lb | 0 | 0 | 10¾ |
| Brazed copper tubes, above ⅝ to 4 in., ₩ lb | 0 | 0 | 9¼ |
| Paper glazing plates, ₩ ton | 126 | 0 | 0 |
| Yellow metal braziers' sheets for india, &c., ₩ lb | 0 | 0 | 6 |
| Yellow metal sheathing and bolts, ₩ lb | 0 | 0 | 6¼ |
| TIN. | | | |
| English refined, ₩ ton | 99 | 0 | 0 |
| " blocks and ingots, ₩ ton | 98 | 0 | 0 |
| " common bars in barrels, ₩ ton | 99 | 10 | 0 |
| Pipe, ¼ up to 1 in., smaller and larger sizes extra, ₩ ton | 114 | 0 | 0 |
| Pure tin sheets, ₩ ton | 112 | 0 | 0 |
| TIN PLATES. | | | |
| Best charcoal I. C., ₩ box | 0 | 19 | 0 |
| Second charcoal I. C., ₩ box | 0 | 18 | 0 |
| Best coke I. C., ₩ box | 0 | 17 | 0 |
| Second coke I. C., ₩ box | 0 | 16 | 0 |
| Terne plates | 0 | 15 | 6 |
| SOLDER. | | | |
| Tinmen's, in bars, ₩ cwt | 0 | 58 | 0 |
| " " quality for tea lead, ₩ cwt | 0 | 60 | 0 |
| Plumbers', in bars, ₩ cwt | 0 | 46 | 0 |
| Brass solder, fine to coarse, ₩ lb | 7d. @ 8¾d. | | |
| Pewter sheet, No. 1, 1/2 ₩ lb; No. 2, 1/. | | | |
| " " stick, No. 1, 10d.; No. 2, 9d. | | | |
| ZINC. | | | |
| Sheets, 8 x 2, No. 9 upward, ₩ ton | 18 | 15 | 0 |
| " 8 x 3, V. & M., ₩ ton | 19 | 10 | 0 |
| Nails, 1¼-inch upward, ₩ ton | 24 | 0 | 0 |
| Spelter, ordinary brands, ₩ ton | £15 @ | 15 | 10 |
| " remelted, ₩ ton | 14 | 0 | 0 |
| " hard, ₩ ton | 11 | 0 | 0 |
| Wire to 16 W. G., ₩ lb | 0 | 0 | 5 |
| Oxide, No. 1 | 19 | 10 | 0 |
| " No. 2 | 18 | 10 | 0 |
| BRASS. | | | |
| Brass wire to 20 W. G., ₩ lb | 0 | 0 | 7½ |
| Brazed tubes, ⅜ to 3-in. out, ₩ lb | 0 | 0 | 9¼ |
| Rolled brass, 2 to 6-in. to 32 W. G., 6 to 12 in. to 30 W. G., common, ₩ lb, 7¼d.; best | 0 | 0 | 7½ |
| Paper glazing plates, ₩ ton | 121 | 0 | 0 |
| LEAD. | | | |
| Lead ore, ₩ ton | 1 | 10 | 0 |
| Pig lead, ₩ ton | 12 | 15 | 0 |
| Bar do, 3 lb and upward, ₩ ton | 13 | 5 | 0 |
| Antimonial lead, ₩ ton | 26 | 0 | 0 |
| Type-metal do., ₩ ton | 28 | 0 | 0 |
| Sheet lead, 3 lb and upward, extras as usual, ₩ ton | 13 | 7 | 6 |
| Do., laminated for damp walls, ₩ ton | 20 | 0 | 0 |
| Lead pipe, ½ to 4½ (¼, ⅓ and 6 in. extra), ₩ ton | 13 | 15 | 0 |
| Do., tinned inside, ₩ ton | 15 | 10 | 0 |
| Tea lead, 5 and 6 oz., ₩ foot, ₩ ton | 17 | 0 | 0 |
| Lead-incased tin pipe, ₩ ton | 30 | 0 | 0 |
| Composition gas tubing, ₩ ton | 15 | 10 | 0 |
| Lead wire to No. 12, ₩ ton | 28 | 0 | 0 |
| " No. 13, " | 37 | 0 | 0 |
| " No. 16, ₩ cwt | 0 | 50 | 0 |
| Hand and deep-sea leads, ₩ ton | 20 | 0 | 0 |
| Lead washers, improved pattern, ₩ ton | 26 | 0 | 0 |
| Lead nails, improved pattern, ₩ ton | 40 | 0 | 0 |
| Lead-headed nails, ₩ ton, No. 9 | 27 | 10 | 0 |
| " No. 10 | 29 | 10 | 0 |
| Patent shot, No. 1 to 3a (larger sizes extra), ₩ ton | 15 | 10 | 0 |
| Hardened shot, No. 1 to 3a (larger sizes extra), ₩ ton | 16 | 0 | 0 |
| Red lead, genuine, in 5 and 10 cwt. casks, ₩ ton | 15 | 10 | 0 |
| Red lead, reduced No. 1, in 5 and 10 cwt. casks, ₩ ton | 14 | 15 | 0 |
| Red lead, reduced No. 2, in 5 and 10 cwt casks, ₩ ton | 14 | 0 | 0 |
| Red lead, reduced No. 3, in 5 and 10 cwt. casks, ₩ ton | 13 | 0 | 0 |
| Glass makers' red lead, in 5 and 10 cwt. casks, ₩ ton | 16 | 0 | 0 |
| Litharge flake, genuine English, 5 cwt. casks, ₩ ton | 16 | 10 | 0 |
| Litharge, powder, 5 cwt. casks, ₩ ton | 17 | 10 | 0 |
| Litharge, pale powder, 5 cwt. casks, ₩ ton | 16 | 10 | 0 |
| Orange lead powder, ₩ ton | 24 | 0 | 0 |
| Dry white lead | 18 | 0 | 0 |
| Genuine ground white lead, ₩ cwt | 30 | 0 | 0 |
| No. 1, ₩ ton | 18 | 10 | 0 |
| No. 2, ₩ ton | 17 | 0 | 0 |
| METALS. | | | |
| Phosphor-bronze alloy ingots, ₩ cwt | 5 | 15 | 0 |
| Manganese, ₩ cwt | 4 | 18 | 0 |
| Gun metal, ₩ cwt | 3 | 10 | 0 |
| Bell metal, ₩ cwt | 4 | 10 | 0 |
| Kingston's bell metal, ₩ cwt | 7 | 10 | 0 |
| Babbitt's bell metal, ₩ cwt | £3 @ | 4 | 0 |
| Taylor's special bearing metal, ₩ cwt | 3 | 10 | 0 |
| Regulus of antimony, ₩ ton | 39 | 0 | 0 |
| Phosphor tin, ₩ cwt | 10 | 0 | 0 |

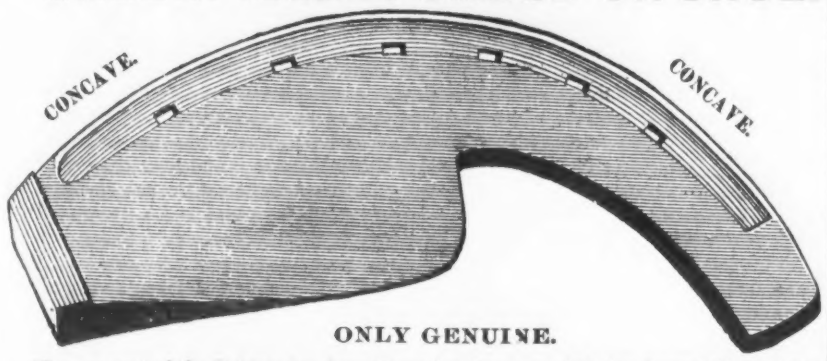
**Imports of Tin Plates from Great Britain for Twelve Years.**—The following table gives the values of the imports of tin plates into the United States from Great Britain, from 1871 to 1882, inclusive:

| Years. | Values. | Years. | Values. |
|---|---|---|---|
| 1871 | $9,946,373 | 1877 | $10,679,028 |
| 1872 | 13,893,450 | 1878 | 9,069,967 |
| 1873 | 14,240,868 | 1879 | 13,227,619 |
| 1874 | 13,057,658 | 1880 | 16,478,110 |
| 1875 | 12,098,885 | 1881 | 14,886,917 |
| 1876 | 9,416,816 | 1882 | 17 075,161 |
| | | Total | $154,970,852 |

Workmen are now engaged in adjusting the curves of the Brooklyn Bridge so as to bring the lines in accordance with the original plans. The work is carried out by tightening or loosening the suspensions rods, as may be required, and readjusting the stays. There are three curves which, when the bridge was first opened, approximately approached the proper lines, and it is thought that the work now in hand will bring them as near perfection as possible.

The Howard Watch and Clock Company, of this city, have concluded a contract for a tower-clock, to be placed in the tower of the new Produce Exchange, similar in size and style to the one in the *Tribune* building. The clock will have electric contact to run inside dials by electricity, and also to strike gongs in the board room to govern deliveries.

## "GREENFIELD" FORGED OX SHOE.




ONLY GENUINE.

We now control the Patents for these Shoes, having succeeded the Greenfield Tool Co. in their manufacture and sale. Recent decisions of the United States Court have sustained the validity of these patents, giving us exclusive right to make Concave Ox Shoes. We believe them to be the best and best-selling shoe in market, and offer them with the fullest guarantees. With our facilities we can fill large orders at short notice, and are now ready to do it.

No. 1, Full Length, Concave, 5 inches, Weight, per Set of Eight Shoes, 3 pounds.
" 2, " " 5½ " " " " " 3½ "
" 3, " " 6 " " " " " 4 "
" 4, " " 6½ " " " " " 5 "

Packed in boxes or kegs of 100 pounds, half each rights and lefts. Full weight, and no charge for packages.

PRICES.

For orders of 1 ton or more.....11 cts. per pound.
" 1000 lbs. or more.....11½ " "
" 500 " " .....12 " "
" less than 500 lbs.....12½ " "

Terms, Net Cash, 30 days.

# MILLERS FALLS CO.,

74 Chambers Street, New York.

FACTORY, - - - - - - - Millers Falls, Mass.

# CHAMPLAIN

## Forged Horse Nails.

MANUFACTURED BY THE

**NATIONAL HORSE NAIL CO.,**

Vergennes, Vermont.

HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST NORWAY IRON AND WARRANTED.

WAREHOUSE

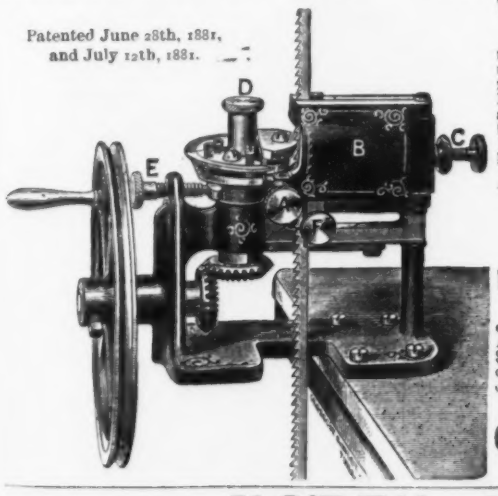
97 CHAMBERS AND 81 READE STREETS, NEW YORK.

DURRIE & McCARTY, Sole Agents.

## AMESBURY'S BAND SAW FILING MACHINE

Will Save Its Cost in a Few Weeks

Patented June 26th, 1881, and July 12th, 1881.




Any boy that can turn a crank can file a band saw in from five to ten minutes more accurately than an expert filer can do the same by hand in one hour. Keeps the teeth even and level, and enables the saw to do more and better work with much less strain. Pronounced by users to be the best labor-saving machine ever introduced

*First Premium and Diploma of St. Louis Agricultural and Mechanical Association, 1881, Awarded for*

Best Band Saw Filing Machine.

Is sold at a price within the reach of every one using a band saw. *Reduced Price List.*—Net price, including 20 files, $32; thin corner and facing files, per dozen, $1.20; thick beveled files, per dozen, $1.80. Terms strictly cash. Send for Catalogue and Testimonials.

GOODELL & WATERS,

3101 & 3103 Chestnut St. Phila., Pa.

## NORTH BROTHERS,

23d & Race St., PHILADELPHIA, PA.,

HARDWARE MANUFACTURERS.

LIGHT CASTINGS A SPECIALTY.

THE HENRY B. NEWHALL CO., 101 Chambers St., New York, and 47 Pearl St., Boston (J. H. Work, Manager), Sole Agents.

SOLE MANUFACTURERS OF THE

"WEED IMPROVED" BORING FAUCET,

For Molasses, Oil, Japan, Varnish, &c.

## VARIETY IRON WORKS.

**KYSER & REX,**

MANUFACTURERS OF

Hardware Specialties,

IRON TOYS, NOVELTIES,

—AND—

HOUSE-FURNISHING HARDWARE.

Main Office and Factory:

Frankford, Philadelphia.

Sample Offices:

11 N. Fourth St., Philadelphia,

116 Chambers St., New York.

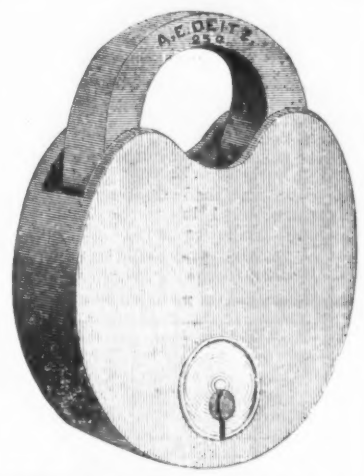
Specialties Manufactured to Order

# RIVETS

ALL KINDS OF RIVETS.

CLARK & COWLES, - - - - - - - Plainville, Conn.

## A. E. DEITZ.




DURRIE & McCARTY, Agents,

97 Chambers & 81 Reade Sts., New York.

# SOUND DEADENED

IN FLOORS AND WALLS OF

FACTORIES,

STORES,

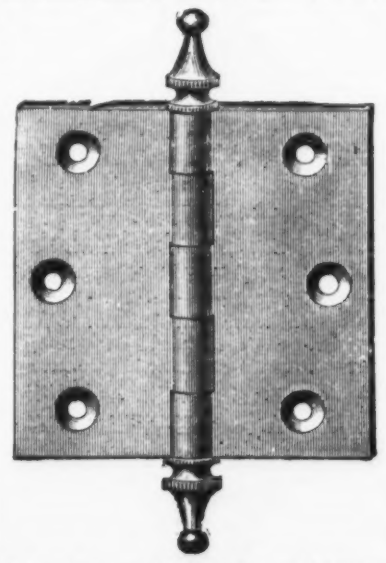
AND DWELLINGS,

By the Fire-Proof Material Called Mineral Wool.

The POOREST CONDUCTOR of heat yet offered. CHEAP and DURABLE. Sample and circular free by mail.

## U. S. MINERAL WOOL CO.

22 Cortlandt St., New York.



CAST BRASS BUTT

# HINGES,

Polished and Plain Finish,

Manufactured and kept in stock by

**W. & J. TIEBOUT,**

Manufacturers of

BRASS, GALVANIZED & SHIP CHANDLERY

HARDWARE,

Nos. 16 & 18 Chambers St.,

NEW YORK.

## BOXWOOD RULES

And Miscellaneous Measures

IN FULL STOCK AT BOTTOM PRICES.

**WM. H. BELCHER,**

MANUFACTURER AND IMPORTER,

89 Chambers Street, - NEW YORK.

Catalogues ready.

## P. W. Gallaudet & Co.

Cor. Broadway and Wall St., New York,

Bankers and dealers in COMMERCIAL PAPER. Stocks and Bonds dealt in for cash or on margin at New York Stock Exchange.

## TINIUS OLSEN & CO.

STANDARD SCALES

AND

# Testing Machines.

Manufacturers of all descriptions of Testing Machines. Tests made daily.

*Office and Works, N. W. cor. 19th and Buttonwood Sts., Philadelphia.*

## L. COES'

Genuine and Mechanics

PATENT

# Screw Wrenches

MANUFACTURED BY

**L. COES & CO.,**

Worcester, Mass.

ESTABLISHED IN 1839.

Our Genuine Wrenches are made with straight bars, full width and enlarged jaw, having ribs cast inside, which strengthen the jaw and give a full bearing on front of bar. These improvements, in combination with our new ferrule, made with double bearings, an iron tube, fitted to the shank and resting against the lower bearings, rigidly held in position by the handle and nut, effectually preventing back thrust of ferrule (see sectional view), verify our claim that we manufacture the heaviest and strongest Wrench in the market. None genuine unless stamped

**L. COES & CO.,**

*Worcester, Mass.*

Warehouse,

97 Chambers and 81 Reade Sts

NEW YORK.

DURRIE & McCARTY,

*Sole Agents.*

## 1883.

## PENNSYLVANIA

# LAWN MOWER.

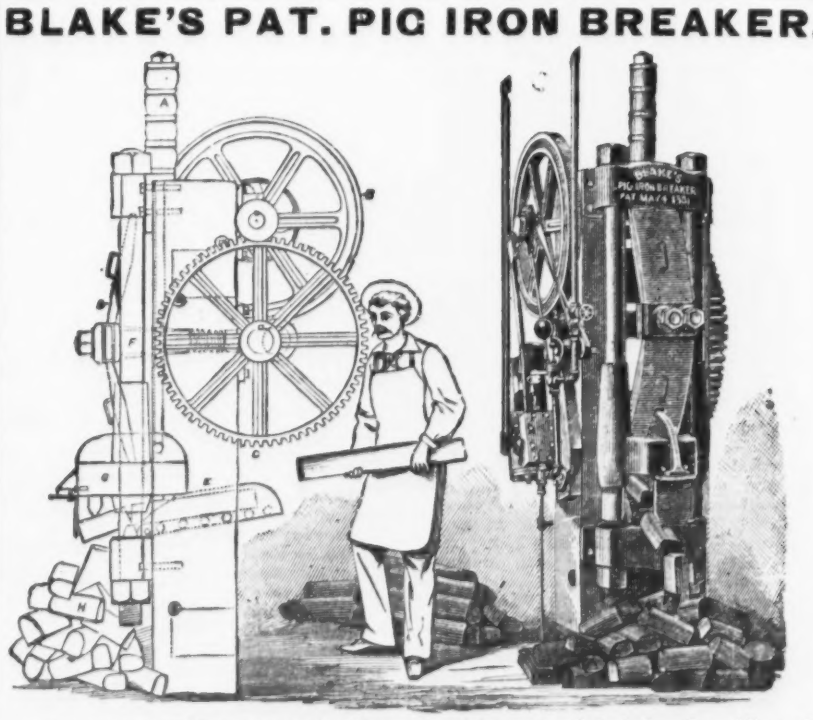
Has no Equal, Surpassing all others, and pronounced

"THE BEST."

For descriptive catalogue and prices write to

LLOYD, SUPPLEE & WALTON, Philadelphia.
DURRIE & McCARTY, New York.
AMES PLOW CO., Boston, Mass.
PRATT & CO., Buffalo, N. Y.
SIMMONS HARDWARE CO., St. Louis, Mo.
HAMILTON & MATTHEWS, Rochester, N. Y.
MARKLEY, ALLING & CO., Chicago, Ill.
HUNTINGTON, HOPKINS & CO., Sacramento and San Francisco, Cal.
R. A. CULTER & CO., Peoria, Ill.
DUCHARME, FLETCHER & CO., Detroit, Mich.
LOCKWOOD, VANDOORN & TAYLOR, Cleveland.
WM. FRANKFURTH & CO., Milwaukee, Wis.
WALTER S. LUDLOW, Cincinnati, Ohio.
LLOYD & CLARKE, La Crosse, Wis.
H. MITHOFF & CO., Columbus, Ohio.
BURROUGH BROS., Kansas City, Mo.
THE TODD-DONIGAN IRON CO., Louisville, Ky
LAYMAN, CAREY & CO., Indianapolis, Ind.
THOMAS, PURYEAR & SLOCUMB, Evansville, Ind
A. E. BONESTEEL, Troy, N. Y.
PERRIN BROS., Lafayette, Ind.

## BLAKE'S PAT. PIG IRON BREAKER.




A new and successful machine for breaking pig iron into any length desired, with rapidity and economy. Besides saving in cost of breaking by hand, it secures the greatest economy in melting. Several machines already in use. Every machine guaranteed against breakage of parts. Requires but three horse-power. Can be run by belt or have small engine attached.

Send for Circulars, Prices, &c.

**BLAKE CRUSHER COMPANY,**

Sole Makers, 85 Orange Street NEW HAVEN, CONN.

# LOVEJOY & DRAKE,

*Manufacturers' Agents,*

101 READE STREET, NEW YORK.

## Iron and Chain, Heavy and Wagon Hardware

RAILROAD & BUILDERS' SUPPLIES, &c.

## ARTESIAN WELL MACHINES.

For our Full Page Advertisement, See First Issue of Each Month.

## Porosity and Specific Gravity of Coke.*

BY FRED. P. DEWEY.

Although coke is the acknowledged metallurgical fuel, and has been extensively used in this country for more than 30 years, yet the facts on record in regard to its physical properties are exceedingly meager; and this is also true, but in a less degree, of its chemical composition. An investigation is being carried on in the National Museum which is intended to supply, so far as may be, this deficiency, and through the kindness of Professor Baird, Director of the Museum, I am permitted to present to the institute a summary of a portion of the result already obtained.

So far as I am aware, the only attempts to determine experimentally any of the physical properties of coke are those made by Mr. John Fulton, Mining Engineer of Cambria Iron Co., and his associate, Mr. David Peelor, published in Report L, 2d Geol. Sur. Pa., 1875, and in a pamphlet setting forth the advantages of the Connellsville coke, the latter also published by the "Virginias." ("Virginias," page 40, 1883.) Of these, however, the latter results are vitiated by determinational errors, amounting in one case to over 15 per cent. of the volume of coke experimented upon; they are, therefore, of no value. In the results published in the 2d Geol Sur. of Pa. Report (Vol. I., page 128), the figures showing the percentage of cells in the coke are based upon the entirely unwarranted assumption that "the specific gravities of coke and water are very nearly alike." It seems a little strange that this assumption should have been made, when a very little calculation upon the data given would have shown that coke is considerably heavier than water. Aside from this, the calculations of specific gravity, from the data given, show a very wide variation, and in some cases are suspiciously low.

In the present communication it is intended to give only results relating to the specific gravity and the amount of cells or pores in the coke. At some future time it is intended to supplement this by determinations of the resistance to crushing and abrasion by microscopic examination, and an attempt will also be made to answer the old, but still unsolved, question of why one coal will coke and another will not.

One of the prime factors upon which the superiority of coke as a metallurgical fuel rests lies in its porosity, permitting, as it does, the very easy penetration of the gases of the furnace to its very center, and therefore its very rapid combustion at the tuyeres and consequent maintenance of the required degree and amount of heat, and therefore the determination of the porosity of coke possesses a very decided practical value aside from its scientific interest. But no estimation of the practical value of a coke can be made from a determination of porosity by itself, for, while the possession of a certain amount of cell space is very desirable and necessary, yet a limit is set upon it, and any increase beyond that limit decreases the practical value of the coke. This limit is reached when the cell walls become so thin that the coke is unable to bear the burden in the furnace, and varies, of course, with different cokes; in some the porosity is far too great to leave sufficient material in the cell walls to give them their needed strength.

The method used in determining the specific gravity, porosity, &c., is founded upon the simple and elegant method proposed by Dr. T. Sterry Hunt. (Chem. & Geol. Essays, T. Sterry Hunt, page 164.) The older and more generally followed method of using an accurately cut cube involves the expenditure of far more labor to secure exactness than is justified, and it is unfortunate that this method proposed by Doctor Hunt should not be more generally known and used.

The method, in brief, is to take fragments of any suitable size or shape, and, after weighing them in air, to thoroughly fill their pores with water. Then two weighings—one in water and one in air—will give all the data necessary for finding the volumes of the specimens, and this is accomplished with far more ease than the cutting of a cube. These three weighings give all the data necessary for determining the following points: True specific gravity, or the actual specific gravity of the coke; the apparent specific gravity, or the relationship between the entire volume of the coke and an equal volume of water; the percentage, by volume, of cells in the coke and volume of cells in a given weight. In experimenting with coke, however, its nature necessitates a few changes in the proceedings as laid down by Doctor Hunt, and I will describe my method in detail.

Suitable specimens from 20 to 40 grams in weight were selected to represent the average physical condition of the coke. These were then weighed as they were received; they were then dried at a temperature of 100° C. for one hour; they were then cooled under the dessicator and weighed, the loss in weight representing the amount of moisture in the specimen as received. The next point was to fill the pores or cells with water, and after considerable experimenting the following general plan was adopted, which was modified in its details to suit particular cases:

It was found more expedient to use a combination of the two methods usually adopted to fill porous substances with water, viz., the use of the air-pump and boiling. The specimens were placed in water and allowed to remain from 12 to 24 hours; they were then placed under the receiver of an air-pump and the air exhausted; the exhaustion was repeated from three to five times. The specimens were then removed and placed in boiling water and boiled for three hours. After becoming nearly cold they were again placed under the receiver of the air-pump and exhausted, and the exhaustion repeated at intervals of 10 to 20 minutes, until no more bubbles were seen to come off; as a precaution, they were further exhausted from six to eight times to insure as complete as possible removal of the air. Owing to the nature of the case, it is not possible to replace the very last traces of air by water, and, in order to determine the probable error from this cause, 18 specimens were again subjected to a varying number of exhaustions, amounting in one case to 20, and it was found that the average gain in weight represented only 0.34 per cent. of the true volume of the coke experimented upon, an error sufficient to cause but a very slight change in the specific gravity. The specimens, now thoroughly saturated with water, were weighed, first in water and then in air. The directions laid down by Dr. Hunt, and the plan generally followed in determinations of porosity, to dry the surface of the specimens with bibulous paper or some other absorbent of water, could not be followed in this case, for, owing to the large percentage of pores in the coke, and to the slight adhesion of water to their surfaces, it was found that on applying any absorbent of water, the water would not only be removed from the surface, but withdrawn from the pores themselves. It was therefore decided that the most feasible plan would be to remove the specimens from the water and allow as much water as would to drain off; they were then weighed as rapidly as possible. By this proceding a double error is induced—first, a plus error from the thin film of the water adhering to the surface of the coke, and, secondly, a minus error from the water flowing out of the pores opening upon the surface. These errors will, in a measure, balance each other. It is necessary to take this weight as rapidly as possible, for the evaporation from the surface of the coke is very rapid and it takes but a few moments for a specimen to lose 10 mg. In order to determine the probable error of weighing these wet specimens, 33 specimens were weighed and again immersed in water, and after standing 12 hours were taken out and weighed again. Of these 33 specimens, 25 gained weight and 8 lost, the average gain being .14 per cent. of the total volume of the coke, and the average loss was .1 per cent. In the determination of the specific gravity there are two sources of variation, one inherent in all specific gravity determinations and unavoidable, and the other accidental and in a measure disappearing in the averages. The first error is due to the possible presence of water-tight pores, or cells, causing a minus error in the determination. The other error is due to the possible presence in a piece of coke of a small piece of slate causing a plus error. The first or minus error applies also to the porosity determination, but its effect is far less in that case than it is upon the specific gravity determination, for in the first case the result is only affected by the actual volume of the water-tight cell, while in the second case, aside from this, determination is affected by the buoyancy imparted to the specimen by the inclosed air or other gas.

In carrying out this investigation 153 specimens of coke have been examined, representing 11 localities producing metallurgical coke, and 1 gas-works coke; in all cases but one, 12 specimens were selected to represent the locality; the exception, Connellsville, is represented by 21 specimens. The results given are reduced to the temperature of the maximum density of water (4° C.), and embrace the maximum and minimum determinations in each set, and also the average of the 12 determinations of the following points: Moisture; true specific gravity, or the actual specific gravity of the coke; apparent specific gravity, or the relationship between the whole volume (including the coke and the cells) and an equal volume of water; the per cent. of cells by volume, and the volume of cells in a given weight of coke (cubic centimeters in 100 grams). But it must be borne in mind that although the determinations are given in a line for convenience, yet it does not follow in every case that related results are obtained from the same specimens—that is, that while in some cases the maximum apparent specific gravity and the minimum percentage of cells given are the results from the same specimen, yet it is not always so; for, in following out the relationship between the results, it is necessary that all the determinations of a specimen should be taken into consideration, and in some cases the results on different specimens, in one or more determinations, will agree within the probable error of determination.

No. 1.—A suite of 9 samples of coke shipped to the Crozer Furnace, at Roanoke, Va., from the Broadford works of Frick & Co., Connellsville, Pa. Analyses of the coal from which this coke was made, and also of the coke, are as follows:

| | Lump coal*. | Slack coal†. | Coke*. |
|---|---|---|---|
| Water | 1.260 | 0.950 | 0.030 |
| Volatile matter | 30.107 | 29.662 | 0.460 |
| Fixed carbon | 59.616 | 55.901 | 89.576 |
| Sulphur | 0.784 | 1.931 | 0.821 |
| Ash | 8.233 | 11.556 | 9.113 |
| Total | 100.000 | 100.000 | 100.000 |
| Color of ash | Reddish gray. | Reddish gray. | |
| Coke, per cent. | 68.633 | 69.388 | |

(Analyst, McCreath.)

* 2d Geol. Sur. Pa., Report M. M., page 107.
† 2d Geol. Sur. Pa., M. M., page 22.

This coke was made in ovens of the beehive pattern, according to the usual method of the Connellsville region (2d Geol. Sur. Pa., Report L, page 63), and the sample taken by Mr. J. H. Bramwell.

COKE, CONNELLSVILLE, BROADFORD—FRICK & CO.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grams. |
|---|---|---|---|---|---|
| Maximum | 0.096 | 1.79 | 1.013 | 54.37 | 66.31 |
| Minimum | 0.008 | 1.73 | 0.819 | 42.20 | 40.83 |
| Average 9-9 | 0.034 | 1.76 | 0.892 | 49.37 | 55.73 |

No. 2.—A suite of 12 specimens given in full to represent the Connellsville region, three specimens each being taken from the product of the following works: First, Morrell ovens; second, H. C. Frick & Co.; third, Schoonmaker & Co.; fourth, J. F. Dravo. An analysis of the Pittsburgh seam of coal at Connellsville, from which this coke was made, is as follows:

| | |
|---|---|
| Fixed carbon | 59.62 |
| Ash | 8.23 |
| Volatile matter | 31.36 |
| Sulphur | 0.784 |
| Total | 99.994 |

Coke, 68 per cent.

These specimens were furnished by Mr. John Fulton, and may fairly be taken to represent the product of the Connellsville region, analyses of which are given below:

| | 1 J. F. Dravo. | 2 J. F. Dravo. | 3 | 3 |
|---|---|---|---|---|
| Water | 0.040 | 0.110 | | |
| Volatile matter | 0.352 | 0.471 | | |
| Fixed carbon | 88.906 | 88.403 | 87.46 | 87.26 |
| Sulphur | 0.771 | 0.818 | 0.69 | 0.746 |
| Ash | 9.931 | 10.178 | 11.32 | 11.99 |
| Total | 100.000 | 100.000 | | |

[1] Analyst, T. T. Morrell, 2d Geol. Sur. Pa., report L, page 120.

[2] Analyst, McCreath, 2d Geol. Sur. Pa., report M M, page 107.

[3] Analyst, ——, 2d Geol. Sur. Pa., report L, page 133.

The samples were selected by Mr. John McFayden.

CONNELLSVILLE COKE.

No. 1.—Morrell Ovens.

| Moisture. | Tr. sp. gr. | A. sp. gr. | Per ct. of cells by volume. | C C in 100 grms. |
|---|---|---|---|---|
| 0.020 | 1.65 | 0.716 | 56.61 | 78.90 |
| 0.017 | 1.80 | 1.007 | 44.02 | 43.69 |
| 0.065 | 1.74 | 0.990 | 43 22 | 43.66 |

No. 2.—H. C. Frick & Co.

| | | | | |
|---|---|---|---|---|
| 0.011 | 1.69 | 1.016 | 40.04 | 39.05 |
| 0.339 | 1.69 | 0.880 | 47.88 | 54.39 |
| 0.046 | 1.67 | 0.873 | 47.65 | 54.58 |

No. 3.—Schoonmaker & Co.

| | | | | |
|---|---|---|---|---|
| 0.023 | 1.83 | 1.119 | 38.76 | 34.62 |
| 0.016 | 1.82 | 0 900 | 50.43 | 56.03 |
| 0.023 | 1.81 | 1.054 | 41.94 | 39.79 |

No. 4.—J. F. Dravo.

| | | | | |
|---|---|---|---|---|
| 0.012 | 1.69 | 0.979 | 42.33 | 43.23 |
| 0.025 | 1.78 | 0.837 | 52.99 | 63.27 |
| 0.042 | 1.73 | 0.743 | 57.21 | 77.04 |

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C C in 100 grms. |
|---|---|---|---|---|---|
| Maximum | 0.339 | 1.83 | 1.119 | 57.21 | 78.90 |
| Minimum | 0.011 | 1.65 | 0.716 | 38.76 | 34.62 |
| Average, 12-12 | 0.053 | 1.74 | 0.926 | 46.92 | 52.35 |

No. 3.—A suite of 12 specimens from the Eagle Ovens, Kanawha, W Va. This coke was made in beehive ovens, from middle measures coal and the sample furnished by Mr. T. Wharton.

COKE —EAGLE OVENS, WEST VIRGINIA.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grms. |
|---|---|---|---|---|---|
| Maximum | 0.074 | 1.74 | 0.979 | 58.14 | 86.54 |
| Minimum | 0.000 | 1.60 | 0.672 | 41.39 | 42.66 |
| Average, 12-12 | 0.021 | 1.68 | 0.894 | 46.85 | 53.89 |

No. 4.—A suite of 12 specimens from the St. Clair Ovens, West Virginia. This coke was made in ovens of the beehive pattern, from middle measures coal and the samples taken by Mr. Thomas Wharton.

COKE—ST. CLAIR OVENS, WEST VIRGINIA.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grams |
|---|---|---|---|---|---|
| Maximum | 0.070 | 1.77 | 1.125 | 63 91 | 74.61 |
| Minimum | 0.008 | 1 57 | 0.725 | 36.25 | 32.21 |
| Average, 12-12 | 0.033 | 1.67 | 0.924 | 44.81 | 50.23 |

No. 5.—A suite of 12 samples from the Quinnemont Furnace, Fayette County, W. Va. The composition of the coal (samples taken from the different headings) from which this coke was made, and also of the coke, is as follows:

| | Coal. | | | | Coke. |
|---|---|---|---|---|---|
| Water | 0.45 | 0.44 | 0.38 | 0.36 | |
| Fixed carbon | 77.97 | 77.74 | 74.90 | 76.89 | 92.62 |
| Volatile matter | 18.99 | 20.06 | 20.15 | 20.76 | |
| Ash | 2.01 | 1.17 | 3.21 | 1.35 | 7 23 |
| Sulphur | 0.56 | 0 59 | 1.36 | 0.64 | 0.66 |
| Phosphorus | | | | | 0.050 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | |

(Analyst, Prof. Thos. Egleston.)

COKE.—SEWELL, NEW RIVER DISTRICT, FAYETTE COUNTY, W. VA.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grams. |
|---|---|---|---|---|---|
| Maximum | 0.033 | 1.74 | 0.801 | 55.79 | 74.32 |
| Minimum | 0.007 | 1.66 | 0.750 | 46.41 | 52.08 |
| Average, 12 12 | 0.016 | 1.69 | 0.793 | 53.19 | 67.39 |

No. 7.—A suite of 12 specimens from Stone Cliff, Fayette County, W. Va. This coke is made from lower measures coal in beehive ovens, 11′ 6″ by 6′, the charge being 9000 for 48-hour and 10,000 for 72-hour coke. The sample was taken by Mr. N. M. Jenkin

COKE.—STONE CLIFF, NEW RIVER DISTRICT, FAYETTE COUNTY, W. VA.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grams. |
|---|---|---|---|---|---|
| Maximum | 0.119 | 1.70 | 0.962 | 57.60 | 77.85 |
| Minimum | 0.039 | 1.66 | 0.740 | 40.20 | 50.14 |
| Average, 12-12 | 0.074 | 1.74 | 0.838 | 51.79 | 62.30 |

No. 8.—A suite of 12 specimes from the Fire Creek Ovens, Fayette County, W. Va. This coke was made in ovens of the beehive pattern, from lower measures coal. The composition of the coal and coke is as follows:

| | Coal.* | Coke.† | Coke.‡ |
|---|---|---|---|
| Moisture | 0.61 | 0.216 | 0.11 |
| Volatile matter | 22.34 | 0.390 | 0.35 |
| Fixed carbon | 75.02 | 95.894 | 62.18 |
| Ash | 1.47 | 3 500 | 6.68 |
| S | 0.61 | 0.563 | 0 618 |
| P | | 0.0096 | 0.027 |

*Trans. Amer. Inst M. Eng., vol. 8, page 267.
†Virginias, 1883, page 99. Analyst, Dr. Henry Froehling, April 3, 1883.
‡Virginias, 1883, page 31. Analyst, J B. Britton, March 3, 1879.

The specimens were selected by Stiles Hotchkiss.

COKE.—FIRE CREEK, NEW RIVER DISTRICT, FAYETTE COUNTY, W. VA.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grams. |
|---|---|---|---|---|---|
| Maximum | 0.161 | 1.88 | 0.897 | 70.10 | 126.58 |
| Minimum | 0.024 | 1.78 | 0.554 | 40.99 | 55.74 |
| Average, 12-12 | 0.078 | 1.83 | 0.820 | 55.72 | 69.05 |

No. 9.—A suite of 12 specimens from the works of the Roane Iron Co, at Rockwood, Tenn. This coke was made from upper measures coal of the following composition:

| | | |
|---|---|---|
| Water | 1.75 | 1.56 |
| Volatile matter | 26.62 | 32.69 |
| Fixed carbon | 60.11 | 60.75 |
| Ash | 11.52 | 5 27 |
| Total | 100.00 | 100.00 |
| Sulphur | 1.49 | |

(Analysts, Dewey, Duncan.)

This coke was made in beehive ovens 11, 12 and 13 feet diameter and 6 feet high, the charges being 100 bushels. The coking occupies 48 hours. It is used in the two furnaces of the Roane Iron Co., at Rockwood, 65 x 16 feet and 65 x 14 feet, and carries a burden of 2.29 pounds to 1 pound of coke. I am indebted to Mr. M. M. Duncan, assistant superintendent, for the above figures and samples.

COKE.—ROCKWOOD, TENN.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grams. |
|---|---|---|---|---|---|
| Maximum | 0 436 | 1.75 | 1.075 | 51.99 | 61.95 |
| Minimum | 0.031 | 1.63 | 0.839 | 38.72 | 36.03 |
| Average, 12-12 | 0.192 | 1.69 | 0.935 | 44.81 | 48.55 |

No. 10.—A suite of 12 specimens from the El Moro works of the Colorado Coal and Iron Co. The coal from which this coke was made occurs in the Laramie formation, which lies at the boundary between the cretaceous and tertiary, and is of the following composition:

| | |
|---|---|
| Water, at 110° C | 1.14 |
| Volatile matter | 29.07 |
| Fixed carbon | 56.32 |
| Ash | 12.57 |
| Total | 100.00 |

Sample of a carload (Analyst, Wells).

This coke is made in ovens of the beehive pattern, 11 feet 6 inches x 6 feet, the charge being 4.2 tons, and the yield 60 to 65 per cent., and time of coking 48 hours.

The amount of ash, as shown by about 40 analyses by Mr. Wells, is 18 per cent., and the percentage of silica in the ash 12 per cent.; the sulphur is from .46 to .53 per cent.

The coke is used in the furnace of the Colorado Coal and Iron Co., at South Pueblo, Col., 65 feet x 15 feet, carrying a burden of 2 pounds to 1 pound of coke.

COKE.—EL MORO, COL.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grams. |
|---|---|---|---|---|---|
| Maximum | 0.225 | 1.85 | 1.047 | 54.66 | 71.16 |
| Minimum | 0.025 | 1.62 | 0.766 | 42.47 | 41.56 |
| Average, 12-12 | 0.114 | 1.69 | 0.919 | 45.75 | 59.32 |

No. 11.—A suite of 12 specimens from the Crested Butte Works of the Colorado Coal and Iron Co. The coal from which this coke was made occurs in the Fox Hills group of the cretaceous of the following composition:

| | |
|---|---|
| Water at 110° C | 1.72 |
| Volatile matter | 23.44 |
| Fixed carbon | 71.01 |
| Ash | 3.83 |
| Total | 100.00 |
| Sulphur | 0.56 |

Sample average of entire face of seam 7 feet thick. (Analyst, Wells.)

This coke is made in ovens of the beehive pattern, 11 feet 6 inches by 6 feet, the charge being about 3.75 tons, and the yield about 70 per cent. The time of coking is 48 hours.

The amount of ash, as shown by six analyses by Mr. Wells is 8.7, the percentage of silica in the ash being 4.6 per cent.; the sulphur is from .46 to .53 per cent.

This coal is from the New River or lower measures. This coke is made in ovens of beehive pattern, 9 feet 6 inches, 10 feet 6 inches and 11 feet 6 inches in diameter and 6 feet high, the charge being 6800 to 8500 pounds, the average yield for a year's working being 64.75 per cent. of the coal charged, and the average of six months being 65.25 per cent. of the coal charged; it is used in the Quinnemont Furnace, 60 x 16 feet, and carries a burden of 2.2 pounds to 1 pound of coke. For the above analyses and figures I am indebted to Mr. J. F. Lewis, general manager. The sample was taken by Mr. Stiles Hotchkiss from 4 carloads of 48-hour coke.

COKE.—QUINNEMONT, NEW RIVER DISTRICT, FAYETTE COUNTY, W. VA.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grams. |
|---|---|---|---|---|---|
| Maximum | 0.076 | 1.92 | 0.791 | 66.58 | 105.49 |
| Minimum | 0.010 | 1.77 | 0.639 | 55 91 | 70.75 |
| Average, 12-12 | 0.041 | 1.84 | 0.713 | 61.12 | 86.41 |

No. 6.—A suite of 12 samples from the coke ovens of Longdale Iron Co., at Sewell, Fayette County, W. Va. This coke was made from lower measures coal. The composition of the coal and coke is as follows:

| | Coal. | Coke. |
|---|---|---|
| Water | 1 03 | |
| Volatile matter | 21.38 | |
| Fixed carbon | 72.32 | 93.00 |
| Ash | 5.07 | 6.73 |
| S | 0.20 | 0.27 |
| Total | 100.00 | 100 00 |

(Analyst, C. E. Dwight. Amer. Inst. M. Eng., Vol. VIII, pages 266 and 267.)

This coke was made in beehive ovens 13′ x 6′, the charge being 12,000 pounds and the yield 62 per cent.; the time of coking 48 and 72 hours. This coke is used in the Lucy Selina Furnace of the Longdale Iron Co., 60′ x 11′, carrying a burden of 2726 pounds to 1 pound of coke. (Jour. U. S. Ass. Charcoal Iron Workers, Vol. II, page 371, 2 of table.) The sample was taken by Mr. J. C. McGuffin.

TABLE OF SPECIFIC GRAVITY, ANALYSES, METHOD OF MANUFACTURE, &c., OF COKE, BY PROF. FRED. P. DEWEY.

| No. | Locality of Coke Works. | Coke.—Specific Gravity, Porosity, &c. Moisture. | (1) True sp. gr. | (2) Apparent sp. gr. | (3) Per cent. of cells by volume. | (4) Volume of cells in 100 grams, C. C. | Weight per cu. ft. Pounds. | Sampled by | Coal.—Geological Position and Analyses. Geological formation. | Water. | Volatile matter. | Fixed carbon. | Ash. | Sulphur. | Analyst. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Broadford, Con'ville, Pa.. | 0.034 | 1.76 | 0.892 | 49.37 | 55.73 | 55.68 | J. H. Bramwell. | Pittsburgh bed | 1.105 | 29.885 | 57.754 | 9.895 | 1.339 | McCreath. |
| 2 | Connellsville, Pa. | 0.053 | 1.74 | 0.926 | 46.92 | 52.35 | 57.81 | J. McFayden. | " " | | 31.36 | 59.62 | 8.23 | 0.784 | T. T. Morrell. |
| 3 | Eagle, Kanawha, W. Va... | 0.021 | 1.68 | 0.894 | 46.85 | 53.89 | 55.81 | T. Wharton. | Mid. measures, (XIII). | | | | | | |
| 4 | St. Clair, " " | 0.030 | 1.67 | 0.924 | 44.81 | 50.23 | 57.68 | " " | " " " | | | | | | |
| 5 | Quinnimont, New River .. | 0.044 | 1.83 | 0 713 | 61.12 | 86.41 | 44.51 | S. Hotchkiss. | Lower " (XII) | 0.41 | 19.99 | 76.87 | 1.94 | 0.79 | T. Egleston. |
| 6 | Sewell, New River, W. Va. | 0.016 | 1.69 | 0.793 | 53.19 | 67.39 | 49.50 | J. C. McGuffin. | " " " | 1.03 | 21.38 | 72.39 | 5.07 | 0.20 | C. E. Dwight. |
| 7 | Stone Cliff, " " | 0.074 | 1.74 | 0.838 | 51.79 | 62.30 | 52.31 | N. M. Jenkin. | " " " | | | | | | |
| 8 | Fire Creek, " " | 0.078 | 1.83 | 0.820 | 55.12 | 69 05 | 51.19 | S. Hotchkiss. | " " " | 0.61 | 22.34 | 75.02 | 1.47 | | |
| 9 | Rockwood, Tenn | 0.192 | 1.69 | 0.935 | 44.81 | 48.55 | 58.37 | M. M. Duncan. | Upper " (XIV-XV) | 1.75 | 26.62 | 60.11 | 11.52 | 1.49 | Dewey. |
| 10 | El Moro, Col | 0.114 | 1.69 | 0 919 | 45.75 | 50.39 | 57.37 | J. Cameron. | Laramie formation | 1.14 | 29.07 | 56.32 | 12.57 | | Wells. |
| 11 | Crested Butte, Col | 0.073 | 1.59 | 0.907 | 42.96 | 47.59 | 56.62 | " | Fox Hills group | 0.72 | 23.44 | 71.91 | 3.93 | | " |
| 12 | Leetonia, Ohio | 0.047 | 1.49 | 0.770 | 47.59 | 62.23 | 48.07 | E. Orton. | Low. Kittanning seam | 3.00 | 31.50 | 62.35 | 3.15 | 1.40 | |
| 13 | Washn. Gas Wks., D. C... | 0.802 | 1.74 | 0.772 | 55.60 | 75.48 | 48.19 | Dewey. | | | | | | | |

| No. | Coke —Analyses of. Water. | Volatile matter. | Fixed carbon. | Ash | Sulphur. | Phosphorus. | Analyst. | Coke.—Method of Manufacture. Style of oven. | Size. | Charge. Pounds. | Yield.—Per cent. | Time of coking.—Hours. | Coke.—For and in what used. Kind of Furnace. | Size of Furnace. | Pounds burden to 1 lb. coke. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.030 | 0.460 | 89.576 | 9.213 | 0.821 | ..... | McCreath. | Beehive | 11′ x 5′ 6″, 12′ x 6′ | 7,600 | 63 | 48 & 72. | Iron blast | 70′ x 16′ | |
| 2 | 0.075 | 0.412 | 88.655 | 10.055 | 0.805 | ..... | " | Beehive | 11′ x 5′ 6″, 12′ x 6′ | 7,600 | 63 | 48 & 72. | Iron blast, &c | | |
| 3 | | | | | | | | Beehive | | | | | | | |
| 4 | | | | | | | | Beehive | | | | | | | |
| 5 | | | 92.62 | 7.23 | 0.665 | 0.050 | T. Egleston. | Beehive | 9′ 6″, 10′ 6″, 11′ 6″ x 6′ | 6,800 to 8,500. | 65 | 48 | Iron blast | 60′ x 16′ | 2.2 |
| 6 | | | 93.00 | 6.73 | 0.27 | ..... | C.E Dwight. | Beehive | 13′ x 6′ | 12,000 | 62 | 48 & 72. | Iron blast | 60′ x 11′ | 2.726 |
| 7 | | | | | | | | Beehive | 11′ 6″ x 6′ | 9,000 to 10,000 | | 48 & 72. | | | |
| 8 | 0.216 | 0 .390 | 95.894 | 3.500 | 0.563 | 0.0096 | H. Frœhling | Beehive | | | | | | | |
| 9 | | | | | | | | Beehive | 11′, 12′ and 13′ x 6′ | 100 bushels. | | 48 | Iron blast | 65′ x 14′ / 65′ x 16′ | 2.29 |
| 10 | | | | 18.00 | 0.50 | ..... | Wells. | Beehive | 11′ 6″ x 6′ | 4 2 tons | 60 to 65 | 48 | Iron blast | 65′ x 15′ | 2 |
| 11 | | | | 8.70 | 0.48 | .... | " | Beehive | 11′ 6″ x 6′ | 3.75 tons | 70 | 48 | Lead smelters, &c. | | |
| 12 | | | | | | | | Beehive | 12′ x 6′ | | | 72 | Iron blast | 75′ x 16′ | 2 |
| 13 | | | | | | | | Retorts | | | | | Domestic | | |

*Note.*—Of the above No. 1 is the average of nine determinations, and the others of 12, for specific gravity, porosity, &c.—Of the coal analyses No. 1 is the average of two analyses and No. 5 of four.—Of the coke No. 2 and the sulphur in Nos. 10 and 11 are the averages of two analyses.

* A paper read at the Roanoke (Va.) meeting of the American Institute of Mining Engineers.

# NEW YORK WHOLESALE PRICES, August 29, 1883.

(For Wholesale Hardware Prices See Pages 31, 32.)

## METALS.

**IRON.**—DUTY: Bars, 8-10c to 1 1-10c ₩ lb; provided that no Bar Iron shall pay a less rate of duty than 35 per cent. Sheet, 1 1-10c to 1 5-10c ₩ lb. Band, Hoop and Scroll, 1c to 1 4-10c ₩ lb. Pig and Scrap, 3-10 of 1c ₩ lb. Plate, 1¼c ₩ lb. Railroad Bars weighing more than 25 lb ₩ yard, 7-10 of 1c ₩ lb.

| | | |
|---|---|---|
| **American Iron** | | |
| Foundry, No. 1 | ₩ ton | $22.00 @ 23.00 |
| Foundry No. 2 | ₩ ton | 19.50 @ 21.00 |
| Gray Forge | ₩ ton | 18.50 @ 19.50 |
| **Scotch Iron.** | | |
| Eglinton | ₩ ton | 21.00 |
| Carnbroe | ₩ ton | 22.50 |
| Coltness | ₩ ton | 23.50 |
| Shotts | ₩ ton | 23.50 |
| Glengarnock | ₩ ton | 22.50 @ 23.00 |
| Gartsherrie | ₩ ton | 24.00 |
| Langloan | ₩ ton | 23.50 |
| Summerlee | ₩ ton | 24.00 @ 23.25 |
| Calder | ₩ ton | 23.00 |
| Dalmellington | ₩ ton | 21.00 |
| **Rails.** | | |
| Steel, at Eastern mills | ₩ ton | 37.50 @ 38.00 |
| Old Rails 1s | | 23.00 @ 24.00 |
| **Scrap.** | | |
| Wrought, ₩ ton from ship and yard | | 23.50 @ 25.00 |
| **Bar Iron from Store.** | | |
| Common Iron: ⅜ to 1 in. round and square; 1 to 6 in. x ⅜ to 1 in. | ₩ lb | 2.10 @ 2.30c |
| Refined Iron: ⅜ to 2 in. round and square; 1 to 6 in. x ⅜ to 1 in.; 1 to 6 in. x ¼ and 5-16 | ₩ lb | 2.30 @ 2.40c |
| Rods—⅜ and 11-16 round and square | ₩ lb | 2.40 @ 2.50c |
| Bands—1 to 6 x 3-16 to No. 12 | ₩ lb | 2.70 @ 2.80c |
| Norway Nail Rods | | 5 @ 5¼c |

**Sheet Iron.**

| | Common American | R. G. American. |
|---|---|---|
| Nos 10 to 16 | ₩ lb 3.15 @ 3.30c | 4½c |
| 17 to 20 | ₩ lb 3.40 @ 3.60c | 4¾c |
| 21 to 24 | ₩ lb 3.65 @ 3.90c | 4¾c |
| 25 to 26 | ₩ lb 4.00 @ 4.25c | 5 c |
| 27 | ₩ lb 4.25 @ 4.35c | 5 c |
| 28 | ₩ lb 4.40 @ 4.65c | 5¼c |
| | B. B. | 20 qual. |
| Galvanized, 10 to 20 | ₩ lb 7 c | 6 c |
| Galvanized, 21 to 24 | ₩ lb 7½c | 6½c |
| Galvanized, 25 to 26 | ₩ lb 8¼c | 7 c |
| Galvanized, 27 | ₩ lb 9 c | 7½c |
| Galvanized, 28 | ₩ lb 9½c | 8 c |
| Patent Planished | ₩ lb 10½c | B. 9½c |
| Russia | ₩ lb 13 | @ 14c |
| American Cold Rolled B. B | ₩ lb | c @ 7½c |

**COPPER.**—DUTY: Pig, Bar and Ingot, 4c; Old Copper 2c ₩ lb. Manufactured (including all articles of which Copper is a component or chief value), 35 % ad valorem.

American Ingot ₩ lb See Trade Report.

SHEATHING BRAZIERS COPPER, BOLTS, &c.

Brazier's Copper, ordinary sizes, under 16 oz. per sq. ft., and over 14 oz. ₩ lb 26c
Braziers' Copper, ordinary sizes, 16 oz. ₩ sq. ft. and over 12 oz. ₩ sq. ft. ₩ lb 28c
Braziers' Copper, 10 oz. and 12 oz., ₩ sq. ft. ₩ lb 30c
Braziers' Copper, Lighter than 10 oz. ₩ sq. ft. ₩ lb 32c
Circles less than 24 in. in diameter ₩ lb 28c
Circles 24 in. diameter and over ₩ lb 31c
Segment and Pattern Sheets ₩ lb 28c
Locomotive Fire Box Sheets ₩ lb 26c
Sheathing Copper, over 12 oz. ₩ sq. ft. ₩ lb 24c
Bolt Copper ₩ lb 26c
Copper Bottoms ₩ lb 31 @ 26c

No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the sq. ft.

TINNING.

Sheets 14 x 48 ₩ sheet 8c
All other size Sheets, 2½c ₩ sq. ft.
For tinning both sides, double the above amount.

O'NEILS PATENT PLANISHED COPPER.—Net.

14x48.

32d 16 oz. and heavier ₩ lb 37c By the case, ₩ lb 36c
oz. and lighter ₩ lb 40c " ₩ lb 39c

*Boiler Sizes.*

7 in., 14x62. 8 in., 14x66. 9 in. 14x60.
and 16 oz. and heavier ₩ lb 39c By the case, ₩ lb 38c
(And all sizes not over 20 in. wide.)
24x48&30x60.
14 and 16 oz. and heavier ₩ lb 41c
oz ₩ lb 44c

SHEATHING METAL.

Yellow Sheathing metal ₩ lb 20 @ 22c

**BRASS.**

*Brown & Sharpe's Gauge the Standard for Metals. Old English Gauge the Standard for Wire.*

BRASS MANUFACTURERS' PRICE LIST.—dis. 30 %.

June 10, 1880.

Cash prices for Roll and Sheet Brass. For less quantities than 100 lbs add 3c. ₩ lb.

HIGH BRASS.

All Nos. not thinner than No. 28, wider than 2 in., not wider than 14 in. 30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive. 35c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive. 38c

4c. ₩ lb advance on each No. above Nos. 28 to 36, inclusive.

All Brass thinner than No. 38 is Platers' Brass, at 43c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in. 37c
Printers' Rules 45c
sheets wider than 30 in. and under 40 in. 47c
" 40 in. and over 50c
regular Sheets, in diam. from 4 in. to 14, inclusive 40c
" over 14 " 20, " 45c
" " 20 " 30, " 49c
" " 30 " 40, " 55c
" " 40 in. 59c

LOW BRASS.

Four cents ₩ lb more than High Brass
Gilding Metal, 8c ₩ lb more than High Brass.
Platers' or Gold Metal: In Bars 48c; Sawed 51c; Planed or Polished 54c

FOR SLITTING.

Metal, in width 1 in. to ⅛ in. to No. 28, inclusive, 1c ₩ lb advance.
Metal, in width 2 in. to 1 in thinner than No. 28, 2c ₩ lb advance.
Metal, in width 1 in. to ⅛ in. thinner than No. 28, 3c ₩ lb advance
Metal in width ⅛ in. to ¼, inclusive, not thinner than No. 28, 2c ₩ lb advance.
Metal in width ⅛ in. to ¼ thinner than No. 28, 5c ₩ lb advance.
Metal, ¼ in. in width and less, 10c ₩ lb advance.
Any of the above widths cut to particular lengths, add 7c ₩ lb.

GERMAN SILVER MARKET METAL AND WIRE.

| | Market Metal. | Wire |
|---|---|---|
| 4 per cent., 12 inch to No. 26 | 8c. 52 | $0.70 |
| 6 " " " | .56 | .76 |
| 8 " " " | .64 | .88 |
| 8 " " " | .80 | 1.12 |

German Silver Sheets over 12 in. wide and weighing more than 10 lb., $2 ₩ lb.

Advance 2c. for each additional inch in width above 12 in. and 2c. ₩ lb on each No. thinner than Nos. 26 to 12, inclusive.

All German Silver thinner that No. 36 is Platers', at 20c. ₩ lb additional.

German Silver Scrap, one-half less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

| | High Brass. | Low Brass. | Gild'g and Copper. |
|---|---|---|---|
| No. 0 to 20 | $0.33 | $0.37 | $0.48 |
| No. 21 | .35 | .40 | .46 |
| No. 22 | .37 | .41 | .47 |
| No. 23 | .38 | .43 | .48 |
| No. 24 | .40 | .44 | .50 |
| No. 25 | .43 | .47 | .53 |
| No. 26 | .45 | .49 | .55 |
| No. 27 | .48 | .52 | .58 |
| No. 28 | .53 | .56 | .63 |
| No. 29 | .55 | .59 | .66 |
| No. 30 | .58 | .62 | .72 |
| No. 31 | .62 | .66 | .78 |
| No. 32 | .66 | .70 | .84 |
| No. 33 | .70 | .74 | .93 |
| No. 34 | .74 | .78 | 1.03 |

Spring Wire 2c ₩ lb advance
Flat Square and Half-Round Wire 5c ₩ lb advance on Round Wire.
Fancy Wire not less than 10c ₩ lb advance on Round Wire.
Brass Rods, No. 8 and larger, not less than 2 feet lengths, 28c.
Wire straightened and cut smaller than No. 8 and not less than 2 feet lengths, 43c.
Wire and Rods less than 2 feet lengths, special rates.
Twelve cents per lb extra for spooling on 1 lb spools No 36.

MISCELLANEOUS.

Brass Pail Ears $0.50
Brass Door Rail .43

SCRAP.—Net.

Rich Brass Scrap 12c
Low Brass Scrap 14c
Gilding 16c
Turnings, Filings and Chips half the price of Scrap.
Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis. 30 %. ₩ lb

Plain to No 20 inclusive above ¼ in. to 3 in. $0.42
Plain above 3 in. .53
Nos 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.
Plain, ¼ inch 70
Plain, 3-16 inch 1.10
Plain, ⅛ inch 1.05
All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing to No. 20 50
English, Scotch and Extra Patterns Fancy Tubing to No. 20 55
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List
Add two cents, ¼ cent for each additional cutting under 2 feet.
All Mandrel Drawn Tubes under 25 in. ¾c ₩ lb advance.

ZINC TUBING—dis. 25 %.

Plain 27
Fancy 33
Scotch and Extra Patterns 36

GERMAN SILVER TUBING.—dis 25 %.

4 Per cent. .80
6 Per cent. .90
9 Per cent. 1.00
12 Per cent. 1.20
15 Per cent. 1.35
18 Per cent. 1.40
20 Per cent. 1.60

**STEEL.**—DUTY: Ingots, Bars, Sheets, &c., valued at 4c ₩ lb or less, 45 % ad val. Valued above 4c and not above 7c ₩ lb, 2c ₩ lb; valued above 7c and not above 10c ₩ lb, 2¾c ₩ lb; valued above 10c ₩ lb, 3¼c ₩ lb. *Extras.* Steel bars, rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, ¼c ₩ lb in addition to above. Steel Circular Saw Plates, 1c ₩ lb in addition to the above.

**American Cast Steel.**

For American Steel see quotations under heading of Pittsburgh.

**English Steel.**

| | |
|---|---|
| Best Cast | ₩ lb 15½c |
| Extra Cast | ₩ lb 16½c |
| Circular Saw Plates | ₩ lb 16c |
| Round Machinery, Cast | ₩ lb 10c |
| Swaged, Cast | ₩ lb 18c |
| Best Double Shear | ₩ lb 14½ |
| Blister, 1st quality | ₩ lb 13c |
| German Steel, Best | ₩ lb 11c |
| 2d quality | ₩ lb 10c |
| 3d quality | ₩ lb 9c |
| Sheet Cast Steel, 1st quality | ₩ lb 15½c |
| 2d quality | ₩ lb 14½c |
| 3d quality | ₩ lb 12½c |

**ANTIMONY** See Trade Report

**LEAD.**—DUTY: Pig, $2 ₩ 100 lb Old Lead, 2c ₩ lb
Pipe and Sheet, 3c ₩ lb.

| | |
|---|---|
| American | 4½ @ 4¾c |
| Bar | 5c |
| Pipe | 6¾c. dis 10 % |
| Tin Lined Pipe | 14c, dis 10 % |
| Sheet | 7½c, dis 10 % |
| Shot | Drop 7c, Buck. 8c |
| Chilled Shot | 8c |

BABBITT METAL.

| | |
|---|---|
| N. P. U | ₩ lb 8c |
| A. 28c: B. 20c: C. 14c. | |

**TIN.**—DUTY: Plates, Sheets, Tagger and Terne, 1c ₩ lb; Bars, Block and Pigs free.

| | |
|---|---|
| Banca | ₩ lb 23½c |
| Straits | ₩ lb 22½c |
| English | ₩ lb 21 c |

TIN PLATES.

| | | |
|---|---|---|
| I C 10x14 / I C 14x20 | Prime Charcoal | $6.25 @ 6.75 |
| Second quality | | $5.87½ @ 6.25 |
| I C 12x12 | Prime Charcoal | 6.50 |
| I X 10x14 / I X 14x20 | Prime Charcoal | 7.75 @ 8.00 |
| Second quality | | $7.25 @ 7.40 |
| I X 12x12 | Prime Charcoal | 8.25 |
| D C 12½x17 | Prime Charcoal | 5.75 |
| D X 12½x17 | Prime Charcoal | 7.25 |
| For each additional X add | | 1.50 |

COKE TIN PLATE.

| | Best. | Ordinary. |
|---|---|---|
| I C 10x14 / I C 14x20 | $5.50 | $5.15 @ 5.40 |
| I C 12x12 | 5.75 | 5.40 @ 5.50 |

TERNE PLATE.

| | Prime Char. | 3d Qual. | Coke. |
|---|---|---|---|
| I C 14x20 | $5.50 @ 5.62½ | 5.25 | 5.12½ |
| I X 14x20 | 7.25 @ 7.50 | .... | .... |
| I C 20x28 | 11.00 @ 11.25 | 10.50 @ 10.75 | 10.00 @ 10.25 |
| I X 20x28 | 14.50 @ 15.00 | .... | .... |
| I C 20x200 | 13.50 | .... | .... |
| I C 14x20 M. F. Brand | | | $7.75 |

**SOLDER**—½ & ½ 15c
Extra .13½c
No. 1 .12 c

**SPELTER.**—DUTY: in Pigs, Bars and Plates, $1.50 ₩ 100 lb.

| | |
|---|---|
| American, cash | 5.00 @ 5.25 |

**ZINC.**—DUTY: Pig or Block, $1.50 ₩ 100 lb: Sheet 2½c ₩ lb.

| | |
|---|---|
| Sheet, Cask | 6¼ @ 6¼c |
| Sheet, Open | 6¾ @ 7c |

## Paper Stock, &c.

*(Dealers' Selling Prices.)*

| | Cents ₩ lb |
|---|---|
| White Shirt Cuttings No. 1 | 7 @ 7½ |
| White Shirt Cuttings, No. 2 | 6½ @ 6 |
| Mill Assorted Whites | 5¼ @ 5¾ |
| Unbleached Muslins | 6¼ @ 6¾ |
| City Whites, No. 1 | 4¾ @ 4¾ |
| New Canton Flannels | @ 6¾ |
| New Seconds, light | 3¼ @ 3½ |
| New Seconds, dark | 2¾ @ 3 |
| No. 2 Whites | 2½ @ 2¾ |
| Cotton Canvas | 4½ @ 4¾ |
| Linen Canvas, No. 1 | 4¼ @ 4½ |
| Seconds, City No. 1 | 1¾ @ 1¾ |
| Seconds, City No. 2 | 1 @ 1¼ |
| Colors, per cwt. | 70 @ 0c |
| Manila Rope | 3¾ |
| Manila Rope, Tarred | 2¾ |
| Gunny Bagging, No. 1 | 1¾ @ 2 |
| Gunny Bagging, No. 2 | 1½ @ 1¾ |
| Kentucky Bagging | 4½ @ 5 |
| Burlap Bagging, No. 1 | 2¼ @ 2½ |
| Tar Shakings | 2 @ 2¾ |
| Hemp Twine Stock | 4¼ @ 4½ |
| Hard White Shavings, No. 1 | 4 @ 4¼ |
| Soft White Shavings, No. 1 | 3¼ @ 3½ |
| White Shavings, No. 2, soft | 3 |
| Mixed Shavings, part white | 2½ @ 3 |
| Ledger and Writing | 3 @ 3¼ |
| Solid Stock | 2½ @ 2¾ |
| Book Stock, No. 1, light | 1¾ @ 1¾ |
| Old Newspapers | 1¾ @ 1¾ |
| Pure Manilas | 1¾ @ 2 |
| Bogus Manilas and Hardwares | ¾ @ 1 |
| Commons per 100 lbs | 60 @ 70 |
| Binders' Board Cuttings | ¾ @ 1 |
| Straw Board Cuttings per cwt | 70 @ 75 |

## Paints, Oils, &c.

**Paints.**

| | |
|---|---|
| Black Lamp, Coach Painters | ₩ lb 22 @ 24c |
| Black Lamp, Ordinary | ₩ lb 0c |
| Black Ivory Drop, fair | 12 @ 15c |
| Black Ivory Drop, best | 23c |
| Black Paint, in oil | kegs 8c; asst'd cans, 11c |
| Blue Prussian, fair to best | 40 @ 55c |
| Blue Prussian, fair to best, in oil | 45 @ 55c |
| Blue Chinese dry | 70c |
| Blue Ultramarine | 18 @ 20c |
| Brown, Spanish | 3½c |
| Brown, Van Dyke | 10 @ 12c |
| Green, Chrome | 15 @ 23c |
| Green, Chrome, in oil | 14 @ 18 @ 25c |
| Green, Paris | good, 20c; best, 25c |
| Green, Paris, in oil | good, 30c; best, 45c |
| Iron Paint, Bright Red | ₩ lb 2½c |
| Iron Paint, Brown | ₩ lb 1½c |
| Iron Paint, Purple | ₩ lb 3 c |
| Iron Paint, Ground in oil, Bright Red | ₩ lb 5½c |
| Iron Paint, Ground in oil, Red | ₩ lb 5½c |
| Iron Paint, Ground in oil, Brown | ₩ lb 5½c |
| Iron Paint, Ground in oil, Purple | ₩ lb 6 c |
| Mineral Paints | 2 @ 4c |
| Orange Mineral | 10c |
| Red Lead, American | 7c |
| Red Venetian (Eng.) dry | $1.65 @ $1.75 |
| Red Venetian, in oil | asst'd cans, 11c; kegs, 8c |
| Red Indian dry | 9 @ 12c |
| Rose Pink | 10 @ 13c |
| Sienna, American, Raw, powdered | 4c |
| Sienna, Burnt, powdered | 4½c |
| Sienna, Burnt, in oil | 10 @ 16 @ 20c |
| Sienna, Raw | 11 @ 15 @ 25c |
| Umber, Burnt, powdered | 4 @ 8c |
| Umber, Burnt, in oil | 9 @ 12 @ 15c |
| Umber, Raw, powdered | 3½ @ 7½c |
| Umber, Raw, in oil | 10 @ 16 @ 45c |
| Vermilion, Chinese | 90c |
| Vermilion, English | 46 @ 48c |
| Vermilion American, Common | 15c |
| White Lead, American, pure dry | 6½ @ 6¾c |
| White Lead, American, pure in oil | 6½ @ 7c |
| White, Paris, English, prime | in bbls. 2 @ 2½c |
| Yellow Ochre, French | $1.75 |
| Yellow Ochre, French, in oil | asst'd cans, 11c; kegs, 8c |
| Yellow Ochre, Vermont | in casks, 1¼c |
| Yellow Chrome | 17 @ 27c |
| Yellow Chrome, in oil | 14 @ 18 @ 25c |
| Zinc White, American No. 1, dry | 5 @ 6c |
| Zinc White, American No. 1, in oil | 5c |
| Zinc White, American No. 2, in oil | 4½c |
| Zinc White, French (Paris) dry | 8 @ 10c |
| Zinc White, French, in oil | 10 @ 11c |

**Oils.**

| | |
|---|---|
| Linseed Raw, in casts and bbls | 56 @ 57c |
| Linseed Boiled, in casks and bbls | 59 @ 60c |
| Linseed, Calcutta | 58 @ 59c |
| Bleached Whale | ₩ gal. 93c |
| Bleached Sperm | ₩ gal. $1.22 |
| Bleached Elephant | 73c |
| Sunual | 75c |
| Prime Lard | 65c |
| No. 1 Extra | 51c |
| West Virginia | 8c @ 15c |
| Drilling | 40c |
| Miners' Oil | 10c @ 42c |
| Fish Oil, pressed | 26c @ 45c |
| Neatsfoot | 70c @ 80c |
| Tallow | 7½c @ 7¾c |
| Empire Cylinder Oil | 54c |
| Machinery | 40c |
| Engine | 40c |

**Sundries.**

| | |
|---|---|
| Asphaltum Cuban | 6¼c @ 9½c |
| Asphaltum Egyptian | 9c @ 10c |
| Benzine | ₩ gal. 8c @ 10c |
| Chalk | 3½c |
| Chalk, Block | 3½c |
| Dryers Patent Am'n | ass't cans, 9c; kegs 7c |
| Frostings | 4c |
| Glue, White | 24 @ 35c |
| Glue, Sheet | 20c |
| Glaziers' Points, Zinc | 8c |
| Gum, Copal | 36c |
| Gum, Damar | 25c |
| Gum Shellac, English | 40c |
| Gum Shellac, English, dark | 35c |
| Litharge | 7½c |
| Mineral Wool, ordinary | ₩ lb 1 @ 1¼c |
| Mineral Wool, extra | ₩ lb 3 @ 3½c |
| Pumice Stone, selected Lumps | 4 @ 5c |
| Pumice Stone, Powdered | 3½c |
| Pine Tar, bbls | $2.75 |
| Pitch | $1.90 |
| Putty, in bladders | 3c |
| Putty, in bulk | 2½c |
| Rosin—Common and Good—Strained | $1.90 |
| E & F | $2.10 @ $2.20 |
| G & H | $2.30 @ $2.50 |
| I & K | $2.60 @ $2.80 |
| M & N | $3.00 @ $3.25 |
| Spirits Turpentine | 42½ @ 43c |
| Whiting Spanish | 2c |
| Waste, No. 1 Cop | 10c |
| Waste, No. 1 White Machine | 10c |
| Waste, No. 2 White Machine | 9½c |
| Waste, No. 1 Colored | 7c |
| Waste, No. 2 Colored | 6½c |
| Waste Washed Machine | c |

**Glass.**

*Prices current per box of 50 feet.*
List, July 2, 1883.

**Single.**

| SIZES. | 1st. | 2d. | 3d. | 4th. |
|---|---|---|---|---|
| 6 x 8 to 10 x 15 | $13.50 | $11.50 | $10.75 | $10.25 |
| 11 x 14 to 16 x 24 | 14.50 | 13.50 | 12.50 | 11.50 |
| 18 x 22 to 20 x 30 | 18.50 | 17.00 | 15.50 | 14.00 |
| 15 x 36 to 24 x 30 | 20.50 | 18.50 | 16.25 | |
| 26 x 28 to 24 x 36 | 22.00 | 20.00 | 17.50 | |
| 26 x 36 to 26 x 44 | 24.00 | 22.00 | 18.40 | |
| 26 x 46 to 30 x 50 | 26.00 | 24.00 | 20.50 | |
| 30 x 52 to 30 x 54 | 27.00 | 25.00 | 21.50 | |
| 30 x 56 to 34 x 56 | 29.00 | 27.00 | 24.00 | |
| 34 x 58 to 34 x 60 | 31.00 | 29.00 | 26.00 | |
| 36 x 60 to 40 x 60 | 35.00 | 31.00 | 29.00 | |

**Double.**

| SIZES. | 1st. | 2d. | 3d. | 4th. |
|---|---|---|---|---|
| 6 x 8 to 10 x 15 | $17.50 | $15.00 | $14.00 | $13.00 |
| 11 x 14 to 16 x 24 | 20.00 | 18.00 | 16.50 | |
| 18 x 22 to 20 x 30 | 24.00 | 22.00 | 20.00 | |
| 15 x 36 to 24 x 30 | 26.50 | 24.00 | 21.00 | |
| 26 x 28 to 24 x 36 | 29.00 | 26.00 | 23.00 | |
| 26 x 36 to 26 x 44 | 30.00 | 28.00 | 24.00 | |
| 26 x 46 to 30 x 50 | 33.00 | 31.00 | 27.00 | |
| 30 x 52 to 30 x 54 | 35.00 | 32.00 | 28.00 | |
| 30 x 56 to 34 x 56 | 37.00 | 34.00 | 30.00 | |
| 34 x 58 to 34 x 60 | 40.00 | 37.00 | 32.00 | |
| 36 x 60 to 40 x 60 | 43.00 | 40.00 | 37.00 | |

Sizes above—$15 per box extra for every 5 inch s. An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 42 inches in length, and not making more than 81 united inches, will be charged in the united 84 inches bracket Discount, 75 and 5.

MEDAL AS ABOVE FOR
Best Rubber Belting Hose and Air Brake Hose.
AWARDED TO
THE HAMILTON RUBBER COMPANY,
MANUFACTURERS ALL KINDS OF RUBBER GOODS.
Send for Price List.
R. T. WHELPLEY, - - Western Agent.
131 and 133 Lake St., CHICAGO, ILL.

INTERCHANGEABLE
LOCK-CORNER SHELF BOXES.
Screw Cases, &c.,
FOR THE HARDWARE TRADE.
S. H. GREEN,
*12 Murray St., New York.*

THE WOODRUFF'S PATENT CELEBRATED AMERICAN SUSPENDING EAVE TROUGH HANGER. The best in the world. Manufactured by GEO. W. HEARTLEY, **301** St. Clair St., Toledo Ohio. Send for prices.

TAPS.

DRILLS.

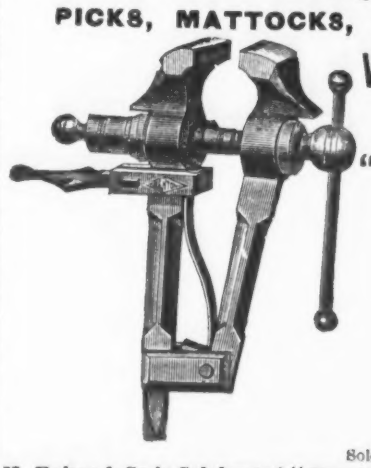
CLAY PIGEONS
AND TRAPS.
WHOLESALE ONLY. AGENTS WANTED.
ADDRESS:
THE CLAY PIGEON COMPANY,
166 Main Street, CINCINNATI, OHIO.

# HERMANN BOKER & CO.,

101 and 103 Duane Street, New York.

PROPRIETORS OF TRENTON TRADE MARK VISE & TOOL WORKS.

PICKS, MATTOCKS, GRUB HOES, HAMMERS.



WROUGHT IRON STEEL FACE
(P. W. PATTERN.)
"FULLY WARRANTED."

Sole Agents for
**H. Boker & Co.'s Celebrated "Tree" Brand Cutlery.**
**R Heinisch's Sons Unrivaled Shears, Trimmers, Scissors,** Japanned and Nickeled,
**Ward & Payne's Sheep Shears.** **Gardner's 1881 Razors.**

J. W. Gardner's Unequaled and "Warranted Superior to All" Barlows, Pocket and Table Cutlery.
Geo. Wostenholm & Son's, Wade & Butcher's, Trenton, and O. K. Pocket Cutlery and Razors.

Jno. Wilson's Butcher Knives, Steels and Shoe Knives,
New England Cutlery Co.'s Table Cutlery,
W. Butcher's Files and Tools,
Guns and Pistols,
Arms and Ammunition.

THE LARGEST FACING MILLS IN THE WORLD.
Capacity, 650 Barrels Per Day.

# S. OBERMAYER & CO.,

Manufacturers of and Dealers in All Kinds of

# Foundry Facings, Blackings,

AND
FOUNDRY SUPPLIES.

PLUMBAGO OR BLACK LEAD

For Lubricating, Electrotyping, Foundry and All Other Purposes.
ALSO SHIPPERS OF
THE CELEBRATED CINCINNATI MOLDING SANDS,
For Stove Plate, Heavy and Light Machinery, Agriculture and Brass Work.

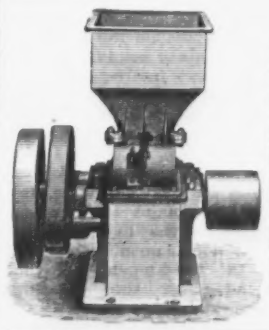
Heavy Machinery and Fine Stove Plate Facings a Specialty.

AGENTS FOR MONK'S CELEBRATED MOLDERS' TOOLS.

SEND FOR ILLUSTRATED CATALOGUE AND PRICE LIST.

Office and Works, Cincinnati, Ohio, U. S. A.

WIRE CLOTH, WIRE COUNTER RAILINGS,
WIRE SIGNS,
Roof Cresting,
&c.
Casting Brushes,
Sand and Coal Screens,
WEATHER VANES AND STABLE FIXTURES.
NATIONAL WIRE AND IRON CO., Detroit, Mich.
Send for Catalogue. Mention this Paper.



NEWELL'S UNIVERSAL MILL.

Pulverizes everything—hard, soft, sticky, and gummy. Grain, Drugs, Chemicals, Clay, Guano, Cotton Seed, Bark, &c., &c. A wonderful machine for grinding Corn, Oats, Feed, &c. Also Steam Engines, Boilers, &c., at lowest rates. Send for circular.

10 BARCLAY STREET,
NEW YORK.

PHILADELPHIA SCREW CO., Limited,
Twelfth and Buttonwood Streets, PHILADELPHIA.

Manufacturers of
IRON & BRASS WOOD SCREWS.

Quality, finish and tests as to strength guaranteed equal to any in the market.

With improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts. A full line in stock.

Merrill Brothers,
26 First Street,
BROOKLYN, N. Y.

DROP HAMMERS, FORGINGS and POWER PRESSES.

sulphur is from .37 to .58 per cent. This coke is used by lead smelters' cupolas, &c., in Colorado.

COKE—CRESTED BUTTE, COL.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grams. |
|---|---|---|---|---|---|
| Maximum | 0.171 | 1.62 | 0.968 | 47.01 | 55.48 |
| Minimum | 0.011 | 1.53 | 0.848 | 37.39 | 38.63 |
| Average, 12-12 | 0.073 | 1.59 | 0.907 | 42.96 | 47.59 |

The samples for this and the preceding determinations were taken by Mr. John Cameron, general superintendent of the coal mines. I am much indebted to the Colorado Coal and Iron Co. for kindness in furnishing samples and information, and especially to Mr. H. L. Wells, chemist.

No. 12.—A suite of 12 specimens from the Leetonia works of the Cherry Valley Iron Co., Columbiana County, Ohio. The coal from which this coke was made—the Lower Kittanning seam of Pennsylvania—which occupies but a small space in Ohio, is of the following composition:

| | |
|---|---|
| Specific gravity, 1.274. | |
| Water | 3.00 |
| Volatile matter | 31.50 |
| Fixed carbon | 62.35 |
| Ash | 3.15 |
| Total | 100.00 |
| Sulphur | 1.40 |
| " left in coke | 0.60 |
| " of coke | 0.92 |

Sample from Salem shaft, bottom bench. (Analyses from Prof. Edward Orton.).

The coal seam is about 30 inches thick, the upper 6 inches being non-coking, and used in the furnace in its raw state. This coke was made in ovens of the beehive pattern, 12 by 6 feet, occupying 72 hours in the coking. It is used in the furnaces of the Cherry Valley Iron Co. at Leetonia, 75 feet x 16 feet, and 55 feet x 14 feet. In the large furnace it carries a burden of about 2 pounds to 1 pound of coke. The sample was furnished by Prof. Edward Orton, and I am indebted to Mr. J. G. Chamberlain, superintendent of Cherry Valley Iron Works, and Prof. Edward Orton for specimens and information kindly furnished.

COKE.—LEETONIA, COLUMBIANA COUNTY, OHIO.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grams. |
|---|---|---|---|---|---|
| Maximum | 0.142 | 1.55 | 0.844 | 52.83 | 74.06 |
| Minimum | 0.012 | 1.4 | 0.706 | 36.06 | 42.71 |
| Average, 12-12 | 0.047 | 1.49 | 0.770 | 47.59 | 62.23 |

No. 13.—A suite of 12 specimens from the Washington City Gas Light Co., added for the sake of comparison. This coke is such as is sold by the company for domestic uses, and has been crushed and washed; consequently, it shows in some cases a high percentage of water; it also shows, as might be expected from the method of its manufacture, wide variations in all the determinations.

COKE.—WASHINGTON GAS WORKS.

| | Moisture. | True sp. gr. | A. sp. gr. | Per cent. of cells by volume. | C. C. in 100 grams. |
|---|---|---|---|---|---|
| Maximum | 2.520 | 2.07 | 0.911 | 66.39 | 133.49 |
| Minimum | 0.179 | 1.48 | 0.497 | 46.59 | 51.84 |
| Average, 12-12 | 0.802 | 1.74 | 0.772 | 55.66 | 75.48 |

The results are put on record without drawing any conclusions therefrom, for, while they are interesting and instructive, yet the investigation is but fairly commenced, and conclusions drawn now may be materially changed by subsequent examinations. There is perhaps no other subject upon which more erroneous conclusions have been drawn from entirely insufficient and often imperfect data than that of coke, and it is especially desired to avoid anything of the kind in this investigation. When the investigation is completed will be abundant time to draw conclusions, and it is intended to make the examination sufficiently extended to embrace a large number of determinations of all the important characteristics of coke, so that it will furnish a basis for forming reliable conclusions in regard to the uses and value of coke.

For the sake of convenience in comparison a table is added, showing all the important information at present accessible in regard to the cokes examined.

## Tools and Building Materials of the Ancient Peruvians.

According to an account in an exchange, Peru, at the the time of its conquest by the Spaniards, extended from 2° N. lat. to 37° S. lat., from Quito to Cuzco. This vast extent of territory was traversed by a paved road 1800 miles long and some 6 or 7 meters wide, carried up the sides of precipitous mountains, and bridging the torrents rushing down their sides by means of suspension bridges that oscillated like hammocks. This work was executed by a people ignorant of iron and steel—a people whose weapons were bronze and polished stone, yet it puts to shame the roads of the iron-using people who have usurped the territory. Along this road ran the *chasquis*, or foot-posts, the bearers of dispatches, and along it marched the armies of the Incas, armed with bows and arrows, war-axes and lances. The arrows and lances were sometimes tipped with metal, but this metal, like that of all workmen's tools except those made of stone, was a kind of bronze—copper mixed with a small quantity of tin to give it a greater degree of hardness. As a consequence of the comparative softness of the metal of which their tools were composed, monuments in sculptured stone are rare, and stone was quarried, according to M. Raimondi, by first heating it by the combustion of straw, and then causing its rupture by projecting cold water upon it. In the erection of buildings inclined planes were used, which increased in length as the structure rose. The bronze tools used by stone masons terminated in a blade at one end and in a point at the other, and were used upon stone previously prepared by fire in the following manner: The parts of the design intended to be left in relief were covered with ashes, and then the entire surface was heated. The unprotected parts were thus disintegrated, so that the incision could easily be completed with the bronze chisel.

Unbaked bricks and cements were made with clay earths; in some localities a quantity of clay was added to a calcareous stone to make a kind of hydraulic lime, and a mixture of chalk and bitumen was used in the construction of the irrigation canals. The largest unbaked bricks were from 40 inches to 5 feet long, and 30 to 40 inches thick. Earthen constructions are particularly common near the Pacific. The walls of important works were often very thick—in some aqueducts as much as 40 feet, and often 22 to 26 feet—yet in ordinary constructions they did not exceed 16 inches. As the materials at their disposal were of small size, they were accustomed to obtain the requisite solidity by building two, three or more walls behind each other. Though Peru possesses numerous timber trees, wood was used but little in construction, except for doors, windows and roofs. Reeds were also made use of in building.

## The Postal Telegraph.

The most important feature in the Postal Telegraph Co.'s plant, says the New York *Times*, is its compound wire of copper and steel. By the patents owned by the company the problem of drawing such wire has been solved. For many years the greatest desideratum in telegraphy has been to secure a wire which possessed high conductivity combined with strength. It has long been known that copper was the best conductor extant, except silver. Copper alone, however, is too soft for wire. It breaks easily and stretches. The question, then, was to combine it with something that would give strength without detracting from its power as a conductor. The wire manufactured by the Postal Telegraph Co. for its own use is made of a steel core, coated heavily with copper. It weighs 200 pounds to the mile, and will resist a tensile strain of 1650 pounds. The wire used on the company's line to Chicago has 500 pounds of copper to the mile and its resistance to the electric current does not exceed $1\frac{7}{10}$ ohms. The heaviest practicable iron wire has a resistance of 8 ohms per mile. Mr. Taylor, the company's electrician, explained to the reporter that this wire permitted the use of batteries composed of only a few cells, with very low tension currents, enabling it to be worked perfectly under all atmospheric conditions on any length of circuit without repeaters and without repeating the messages. Iron wires on long circuits require repeaters and powerful batteries, with high-tension currents. This compound wire is manufactured by either one of two processes. The first lays the copper upon the steel by chemical action. The second, and the one on which the company place the most reliance for practical results of great value, is a purely mechanical operation. A large rod of steel is inclosed in a large cylinder of copper. Some of those which the reporter saw were as large as a crowbar. The whole can then be drawn out to any required size. The company use several sizes, the smallest not being a great deal thicker than a big pin. The small size is the one which will undoubtedly come to be used for telephone communication. The reduction in resistance to the current in this wire is of the greatest importance. The best wires in ordinary use are No. 6 iron, on which the resistance between New York and Chicago amounts to 10,000 ohms. On the compound wire the resistance is 1700 ohms, thus bringing Chicago telegraphically as near to New York as Philadelphia, as compared with the best wires now in use. These facts are no longer matters of theory, as they are proved by the daily operations of the postal wires. Mr. Fairbanks, the Superintendent of Construction, said that every possible precaution had been taken to make the lines strong and to avoid leaks. The poles are high, and the wires run above those of the other companies. If some one else's wire breaks down it does not cross the Postal lines. The insulators are made by the company, and are much larger and stronger than those ordinarily used. The wires are fastened to them with a loop of small copper wire, so that if a tree falls on the wire it is not broken, but simply falls to the ground. The company have a patent joint which unites the ends of wires without making necessary the old style of twisting, which reduced the strength of the wire one-quarter at the point of junction. The peculiar kind of wire used by the company is what makes possible the advantageous use of its methods of sending and receiving. These are very interesting, being an approach toward sending without an operator. Indeed, by the use of the keyboard system any person can send messages over the Postal lines.

There are two systems in use in the operating room. One is the Gray harmonic, and the other the Leggo automatic Of the two, perhaps the former is the more curious, depending, as it does, upon a musical principle. It is a well-known fact that if a person bends over the sounding-board of a piano and sings the note C, all the Cs in the piano will sound. An application of this fact is made in the Gray harmonic system. Each receiving instrument is provided with a peculiarly constructed tuner. The operator in Chicago tunes up his instrument to the same note as the one in New York. They may both be put, for instance, at A in the second space of the treble clef. The electric current causes the tuner to vibrate, and, as they are in unison, there is a constant flow of the sound waves of the note A over the wire. Now, the principle is well known that the sound waves of different notes are of different lengths, but those of the same note are always of the same length. Professor Gray has applied this principle in such a way that a number of messages can be sent over the same wire, in one or both directions, at the same time. One operator is working, as has been stated, in A; another may work in C and a third in E. The sound waves of these different notes are different in length, and, consequently, may be sent over the same wire without interfering with each other. The result is that the messages are actually intoned over the wire, the ordinary telegraphic instrument simply measuring out the length of the notes. A curious feature of the method is that the sound of the note is not heard, the telegraphic instrument clicking just as it ordinarily does. If, however, one end of a stick be placed against the receiver, and the ear be placed at the other end, the musical note will be distinctly heard, buzzing away much like a telephone does when it has a refractory fit. Eight or more messages may be sent on a single wire, thus practically increasing the number of wires without the cost of additional wires or of keeping them in repair. This method also admits of a way duplex system, by which any number of stations on a line may communicate with each other on a single wire on which through business is being done. This kind of telegraphic concert is in daily use in the Postal Co.'s operating room, and is an interesting study.

The Leggo automatic system is a method of attaining great speed in sending messages. Like all other labor-saving machines, it can do an enormous amount of work more than can be done by manual labor. It will transmit automatically on a single wire any number of words up to a thousand or more per minute. It can transmit messages automatically on a single wire and receive them automatically at the end of the circuit, and retransmit them at the same speed over any number of circuits, all from a single setting on a single instrument, which is impossible by any other system, securing immediate delivery over any number of circuits and saving more than one-half the operating expenses where messages are retransmitted. It enables any number of local officers in the city or near by to transmit messages by the ordinary method to a central office by wire, where they will be received by an automatic instrument, and are ready for instant and rapid transmission over the company's lines. It will enable commercial and financial houses to prepare their messages in their own offices and send them instantly to their corresponding houses at any distant point without the intervention or knowledge of the company's employees. This, of course, is equal to having a private wire. The instrument which accomplishes all this is simple. It consists principally of a copper cylinder, which is revolved by steam either fast or slowly at the operator's pleasure. Above this cylinder, on a traveler, is a reservoir containing an ink, which is simply a colored mucilage. A pen, which is simply a metal tube, is attached to the reservoir, and its end rests on the cylinder. The operator, using either the ordinary Morse instrument or a keyboard, governs the movements of the pen. He telegraphs, at the rate of 20 or 25 words per minute, his message to the pen, which writes the message out again in telegraphic characters on the cylinder as it revolves slowly. The cylinder is kept heated and the ink dries rapidly. When the cylinder is full the writing pen is moved aside, and the sender, which is a fine-pointed instrument pressing down very hard on the cylinder, is moved into place. Then the cylinder is put into swift motion. When the sending pen passes over the mucilage the current is broken, and when it touches the copper between the mucilage marks, away goes the electric spark to Chicago. The rapidity with which these messages are sent out is almost inconceivable. The Postal Co. have 12 of them, and Mr. Taylor, the electrician, says they can send 20,000 words per hour. One advantage of this system is that the messages can be prepared as they come into the main office from branch offices, by receiving them on the cylinders, and can then be sent off in a few minutes and received automatically at the other end of the wire. Not a single skilled operator need be used in the whole transmission. The receiving apparatus used at the end of the line consists of a fine wire, which rests on a strip of chemically-prepared paper. The contact of the electric current with this paper decomposes the little wire, making blue marks on the paper and writing out the messages in telegraphic characters. They are then turned over to the type writers, who write them out, and they are then ready for the person to whom they are addressed. One of the officers of the company said to the *Times* reporter that this automatic system was certainly the only one which would make possible the sending of letters by telegraph, and realize the idea of a genuine postal telegraph service.

## The Mechanical Engineer.

At the annual excursion of the British Institution of Mechanical Engineers, which this year was to Liége, a fine town in the center of Belgian industry, the president, Mr. Westmacott, delivered the opening address, in which he defined the position of the mechanical engineer in the world's work. We append some interesting extracts:

"Engineering brings all other sciences into play. Chemical or physical discoveries, such as those of Faraday, would be of little practical use if engineers were not ready with mechanical appliances to carry them out and make them commercially successful in the way best suited to each. * * * The keen and continued attention thus bestowed upon the work to be done, and the means of doing it, have led engineers in general to regard speed of production as one of the first elements of success. There is, indeed, a proverb, "More haste less speed," but this, though it is true of human labor, which ceases to be accurate when forced beyond a certain rate, does not hold good of mechanical processes. Generally it may be said that rapidity of working not only reduces cost, but improves the result, and also confers great benefits from the way in which it brings out and perfects the highest qualities of the engineer. To be able to do a thing leisurely and also quietly, simply requires the rudest materials and the rudest workmanship; but if work is to be done quickly, or the appliances made to move quickly, the case alters. Mechanical energy increases as the square of the speed; and so it may be said that the mental energy and skill required to carry on increase also at something like the square of the speed with which that work is done."

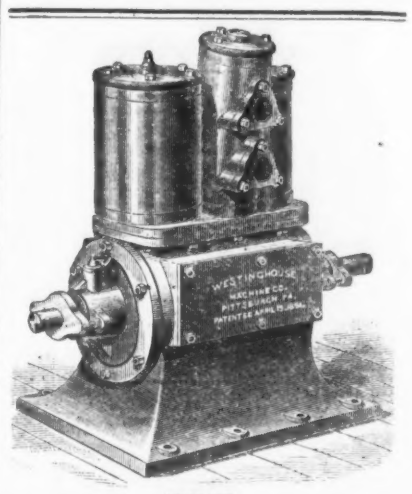
The president went on to remark that he might be pardoned if he reviewed with some degree of pride the position now attained by the engineer. "For if the inventive skill of the engineer had not provided those appliances on which all trades are dependent for cheap and rapid production, what, may I ask, would have been the result of the great increase in population which has taken place in recent times? The nations of Europe would be like the hordes of barbarians in the early ages of Christianity, who were compelled to overrun neighboring countries with fire and sword in order to provide an outlet for their own population. But the advances of commerce and industry, consequent upon the invention of mechanical processes and appliances, have enabled nations both to find work for their population at home and to send their children cheaply and readily to unoccupied countries, where they are at once able to utilize and to subsist upon the boundless resources which those countries contain. A great debt is therefore due to the engineer. It may well be questioned whether the world does not owe more to George Stephenson, as the founder of the modern system of speedy transport, than to any of the great public men she has produced. Nor is the advantage one which relates to money only; it is a question of peace and prosperity, for the more people are occupied in peaceful industries, the less risk there is that they will be inclined to engage in devastating wars.

"There are other advantages following in the train of that immense extension of engineering progress which has taken place all over the world. Among these may be mentioned the impetus given thereby to education. While the mere tilling of the land can be followed out by a man totally devoid of education, this becomes impossible if he has to exercise arts requiring skillful training. Belgium has been especially ready to recognize this fact, and the institutions she has established for the education of the working classes are justly considered as models for the rest of Europe."

**The Labor Congress.**—The sessions of the Federation of Organized Trade and Labor Unions of the United States and Canada, at the Turn Hall in this city, came to a close a few days since, Mr. McLogan, of Chicago, having been elected as president. The Congress deemed the eight-hour law of paramount importance, and for the third time in succession expressed that fact by resolution. It was also resolved to support the bill before Congress for the protection of lake seamen, and the establishment of a home for aged and injured seamen was recommended. Mr. Powers, who is president of the Lake Seamen's Association of Chicago, said that every lake seaman pays the Government 40 cents a month. The Government, he added, has a good marine hospital on Lake Michigan, but it does not give shelter or medical care to patients for longer than 60 days. Mr. Edmonston read a letter announcing that the Knights of Labor were endeavoring to promote the better affiliation of trade and labor organizations. A communication from Mr. Jarrett, president of the Amalgamated Iron and Steel Workers, refusing to affiliate with the Federation until it rescinded the action it took on the tariff a year ago, was referred to the Legislative Committee, with instructions that an answer be made that the Federation had expressed no opinion on the tariff or any political questions.

Referring to the arsenal of Hue, the capital of Annam, we find it stated that in 1828, when Dr. Crawfurd went there as Ambassador from the Governor-General of India, he saw in this arsenal a great number of old ship guns—English, French, Dutch and Portuguese. But there were also whole parks of brass ordnance, made in Cochin China from metal dug in Tongking mines. The models were French guns, and they were mostly howitzers and mortars. Crawfurd saw nine 93-pounders with Gia Long's name cast on them. The gun carriages were neatly painted, and, contrary to Oriental habit, the guns themselves were kept in good working order. This statement is borne out by the letters of many missionaries in the "Annales de Propogation de la Foi," one enthusiastic father declaring that the pieces were so highly polished that they shone in the sun like silver. Whether the Annamese gunners are able to work their guns as well as keep them in order remains to be seen.

The text of the treaty of commerce and amity between Mexico and Germany has been officially published. The treaty contains the most favored nation clause. Under its provisions, German residents in Mexico are to pay no taxes that are not levied on Mexicans. They are to be exempt from military service and from contributions in lieu thereof, also from forced loans.

THE
**Westinghouse Automatic Engine.**
THE PROOF OF THE PUDDING IS THE EATING!
LIST OF SALES FOR JULY, 1883.

| | H. P. |
|---|---|
| Hussey, Howe & Co. Rolling Mill, Pittsburgh, Pa. | 125 |
| Oliver Bros. & Phillips, Wire Mill, Pittsburgh, Pa. | 60 |
| C. H. Hobbs, Saw Mill, High Point, N. C. | 60 |
| American Certaigo Marble Co., Pittsburgh, Pa. | 60 |
| Mutz & Cassidy, Planing Mill, Ferris, Tex. | 50 |
| Blakeman & Dobson, Planing Mill, Rockford, Ill. | 50 |
| C. L. Blakeslee, Planing Mill, Schenectady, N. Y. | 50 |
| P. M. Brown, Flour Mill, Mill Bridge, N. C. | 40 |
| Johnson & Caldwell, Oil Mill, Hillsboro, Tex. | 40 |
| W. W. Cloud, Saw Mill, Blythewood, S. C. | 40 |
| Utica Match Co., Utica, N. Y. | 40 |
| C. C. Ball, Saw Mill, Alexandria, La. | 40 |
| Agard & Co., Flour Mill, Rockford, Ill. | 40 |
| Cornish & Curtis, Planing Mill, Ft. Atkinson, Wis. | 40 |
| G. H. Blood, Oil Mill, Pine Bluff, Ark. | 30 |
| Henry D. Mentzie, Paper Mill, Ellicott City, Md. | 30 |
| C. H. Parmalee, Stamp Mill, Dadeville, Ala. | 30 |
| J. W. Bullock, Ginning, Calhoun, Ala. | 30 |
| Barr & Peterson, Saw Mill, Portland, Oregon | 30 |
| Hudson Lumber Co., Hudson, Wis. | 30 |
| B. F. McClendon, Ginning, Alvarado, Tex. | 20 |
| Stonewall Mfg. Co., Cotton Mill, Enterprise, Miss. | 20 |
| John R. Miller & Co., Hat Manufactory, Reading, Pa. | 20 |
| Yale & Towne Mfg. Co., Cranes, Stamford, Conn. | 20 |
| W. Burgis, Printing, Chicago | 20 |
| S. H. Ferguson, Ginning, Franklin, Tex. | 20 |
| H. J. Burton & Co., Electric Light, Minneapolis, Minn. | 20 |
| Niles Paper Mill Co., Niles, Mich. | 20 |
| S. B. Newman, Ginning, Port Sullivan, Tex. | 20 |
| J. G. Powledge, Ginning, Aubrey, Tex. | 20 |
| C & H N. Valley, Ginning Fairfield, Tex. | 12 |
| Indianapolis Malleable Iron Co., Indianapolis, Ind. | 12 |
| Muhlenburg & West, Machinists, Reading, Pa. | 12 |
| S. F. Hayllard, Planing Mill, Calera, Ala. | 12 |
| S. R. McCarty, Ginning, Calvert, Tex. | 12 |
| W. W. Cook, Ginning, Fort Valley, Ga. | 8 |
| G. W. Parsons, Rotary Pump, Salisbury, Md. | 8 |
| J. D. Malone, Ginning, Bethel, Tex. | 8 |
| John C. Wootten, Philadelphia, Pa. | 8 |
| Steamer Josie Harry, Electric Light, Memphis, Tenn. | 4 |
| Steamer Maggie Burke, Electric Light Mobile, Ala. | 4 |
| Noah Mitchell, New York | 4 |
| Jacksonville Gas Co., Jacksonville, Ill. | 4 |
| Total | 1239 |

*Over 11,000 Horse-Power Now in Use. Send for Illustrated Circular and Reference List.*

THE WESTINGHOUSE MACHINE COMPANY,
PITTSBURGH, PA.

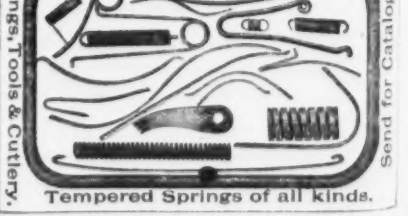
**"AUSTRIA" CLUB SKATE.**

We carry in stock a complete line of all the prominent makes of Club Skates, Straps and Gauges. Wood Lasts, Skate Parts for repairing, &c.

SELF-FASTENING BY STEPPING ON THE SKATE.

Brief mention is made of the following points in favor of the "Austria," which tend to make it the most popular Club Skate now in use, viz., exceeding *simplicity* (there being but one screw in the skate, welded, hardened runners, solid steel clamps, &c. Can be adjusted more securely and quickly than any other skate, are far superior to any other patent for range of adjustment to either the smallest heel and narrowest toe or the extreme opposite. Send for sample and price to Wm. M. Cornwell (Sole Agt.), 18 Warren St., New York. Orders executed at manufacturers' prices. Complete Price Lists on application.

TUCK M'F'G CO. Brockton, Mass.



Springs, Tools & Cutlery. Send for Catalogue.

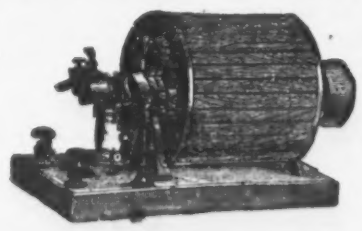
Tempered Springs of all kinds.

The above cut represents Preston's Patent Braided Cable Wire Fence Rail, manufactured by the **HOLLOW CABLE MFG CO., Hornellsville, N. Y.** We also manufacture extensively four different sizes Wire Clothes Lines. Send for Circulars and Price Lists.

**Chamberlain, Coxe & Millar, Western Agents, 89 Lake St., Chicago, Ill.**

THE
**AMERICAN DYNAMO-ELECTRIC MACHINE,**
**For Electro-Plating, Electrotyping, &c.**

Requires no Water. Combining all the Latest Improvements. Cannot Reverse Current.



**The Zucker & Levett Chemical Co.,**
GENERAL AGENTS,
Manufacturers and Importers of NICKEL PLATERS' SUPPLIES.
**538, 540, 542, 544 & 546 West 16th Street, N. Y.**

# New York Wholesale Prices, August 29, 1883.

(For Wholesale Metal Prices See Page 29.)

## HARDWARE.

**Anvils.**
Eagle Anvils American ₩ lb 10c—dis 20 %
Wright's 11c @ 11½c
Armitage's Mouse Hole 9½c @ 9¾c
Armitage's Mouse Hole (extra quality) 11½c
Trenton 10½c
Wilkinson's 10½c

**Anvil Vise and Drill.**
Millers Falls Co., $18.00 dis 20 %
Cheney Anvil and Vise dis 33⅓ %

**Augers and Bits.**
Conn. Valley Mfg. Co.
Douglass Mfg. Co.
T. E. Jennings & Co.
Humphreysville Mfg. Co.) dis 50@55 % from list of Jan. 7, 1880.
Beecher (French, Swift & Co.
Griswold
Nobles Mfg. Co.
Snell Mfg.
Watrous & Co. Extension Lip dis 35 %
Cook's Douglass Mfg. Co dis 40&10 %
Patent Solid Head dis 30 %
Lewis' Patent Single Twist dis 25 %
Russell Jennings' Auger, Dowel, Machine-Dowel and Hand Rail Bits dis 10&10&10 %
Russell Jennings' Augers dis 10%&10&10 %
Russell Jennings' Car and Machine Bits, Boring-Machine and Millwrights' Augers dis 25&10&10 %
Imitation Jenning' Bits dis 50 %
Ives' "Jennings'" Bits dis 40&10 %
Snell Mfg. Co.'s Jennings' Bits dis 40 %
Expansive Bits, Clark's, small, $18; large, $26 dis 25 %
Expansive Bits, Ives' $20 @ $30—dis 33⅓&10 %
Expansive Bits, Blake's $20—dis 40 %
Expansive Bits, Derby, $17 and $26 dis 40 %
Hollow Augers, Ives dis 25 %
Hollow Augers, French, Swift & Co.
Hollow Augers, Douglass' 25 %
Hollow Augers, Bonney's Adjust. ₩ dz. $18—dis 25&10 %
Hollow Augers, Stearns' Adjust. ₩ dz. $18—dis 20&10 %
Hollow Augers, Ives' Expansive, each $3.50—dis 30&10 %
Hollow Augers, Universal Expan., each $4.50—dis 20 %
Wood's dis 25 %
Gimlet Bits $7.50 ₩ gross, dis 50 %
Gimlet Bits, Diamond ₩ doz. $1.10, dis 25&10 %
Gimlet Bits "Bee" dis 25 %
Double Cut Gimlet Bits, Shepardson's dis 45 %
Double Cut Gimlet Bits, Ct. Valley Mfg. Co. dis 20&10 %
Double Cut Gimlet Bits, Hartwell's dis 60 %
Double Cut Gimlet Bits, Douglass' dis 40 %
Double Cut Gimlet Bits, Ives' dis 50 %
Morse's Bit Stock Drill dis 25&10 %
Holtz Bit Stock Drills dis 25&10 %
L'Hommedieu's Ship Augers dis 15 %

**Awl Hafts.**
Sewing, Brass Ferrule $3.50 ₩ gross—dis 40&10
Patent Sewing, Short $1 00 ₩ doz.—dis 40&10 %
Patent Sewing, Long $1.20 ₩ doz.—net
Patent Peg, Plain Top $10.00 ₩ gross—dis 40&10 %
Patent Peg, Leather Top $12.00 ₩ gross—dis 40&10 %

**Awls, Brad Sets, &c.**
Awls, Sewing, Common ₩ gross $1.70—dis 25&10 %
Awls, Shouldered Peg ₩ gross $2.25—dis 25&10 %
Awls, Patent Peg ₩ gross 90c—dis 25&10 %
Awls, Shouldered Brad ₩ gross $2 70—dis 25&10 %
Awls, Handled Brad $7.50 ₩ gross—dis 25&10 %
Awls, Handled Scratch $7.50 ₩ gross—dis 25&10 %
Awls, Socket Scratch $1.50 ₩ gross—dis 10&10 %
Brad Sets, Aiken's ₩ doz $10.00—dis 50&10 %
Millers Falls Adj. Tool Hdles ₩ doz $12—dis 25 %
Brad Sets, No. 42, $10.50; No. 43, $12.50 dis 70&10 %
Brad Sets, Stanley's Excelsior, No. 1, $9.00 dis 30&10 %
Brad Sets, Stanley's Excelsior, No. 2, $1.80 dis 30&10 %
Brad Sets, Stanley's Excelsior, No. 3, $7.80 dis 40&10 %

**Axes.**
Single Bit, 4½ to 5½ and under ₩ doz 8.00 net
Single Bit, 4½ to 6 and over ₩ doz $8.50 net
Single Bit, beveled 50c ₩ doz advance
Double Bit, 4½ to 5½ and under ₩ doz $15.00 net
Double Bit, 4½ to 6 and over ₩ doz $16.00 net
Double Bit, beveled $1.00 ₩ doz advance

**Axle Grease.**
Frazer's ₩ lb 6c

**Axles.**
Standard list dis 45 %

**Balances.**
Spring Balances. dis 33⅓ %

**Bells.**
Hand, Light Brass dis 70 %
Hand, Extra Heavy dis 45 %
Hand, White Metal dis 60 %
Hand, Silver Chime dis 20&10 %
Hand, Globe (Cone's Patent) dis 25&10 %
Gong, Abbe's dis 20&10 %
Gong, Yankee dis 30&10 %
Gong, Barton's dis 30&10 %
Crank, Taylor's dis 25&10 %
Crank, Brooks' dis 50&10&2 %
Crank, Cone's dis 10 %
Crank, Connel's dis 15&10 %
Lever Sargent's dis 55&10 %
Lever, Taylor's Bronzed or Plated net
Lever, Taylor's Japanned dis 25&10 %
Lever, R. & E. M. Co.'s dis 50&10&2 %
Lever, Reading dis 25&10&10 %
Pull, Brook's dis 50&10&2 %
Pull, Western dis 25&10 %
Call dis 25 %
Cow, Common Wrought dis 55&10 %
Cow, Western, dis 20&10 %
Cow, Western, Sargent's new list dis 60&10&10 %
Cow, Kentucky "Star" dis 20&10 %
Cow, Kentucky Sargent's new list dis 60&10&10 %
Cow, Dodge' Genuine Kentucky, new list—

| Nos. | 0 | 1 | 1½ | 2 | 4 | 5 | 6 | Hog |
|---|---|---|---|---|---|---|---|---|
| | $12.00 | 10.0 | 9.0 | 8.00 | 7.00 | 5.00 | 3.50 | 2.50 | 5.00 |

dis 60 %

Cow, Texas Star dis 4c&10 %

**Bellows.**
Blacksmiths Common dis 45 %
Blacksmiths' Extra Pittsburgh Pattern dis 20 %
Molders' dis 25 %
Hand Bellows dis 20 %

**Belting, Rubber.**
Belting and Packing Co. dis 50 %

**Bit Holders.**
Extension, Barber's ₩ doz $15.00—dis 40&5 %
Extension, Ives' ₩ doz $150—dis 40 %
Diagonal ₩ doz $24.00—dis 40 %
Angular ₩ doz $24.00—dis 40&5 %

**Blind Adjusters.**—Domestic ₩ doz $3.00—dis 30 %
Excelsior ₩ doz $16.00—dis 50&10&2 %

**Blind Fasteners.**
Mackrell's ₩ doz pairs, $1.00 dis 20&10 %
Van Sand's Screw Pattern $9 ₩ gro. dis 10&2%
Van Sand's Old Pattern $9 ₩ gro. dis 10&2 %
Washburn's Old Pattern $9 ₩ gro. net
Merriman's new list, net
Salisbury & Austin, No. 2008 $9 per gro. net
Security Gravity $9 per gross. net

**Blind Staples.**
Bar bed, ½ in. and larger ₩ lb 9½c net
Bar bed ⅜ in. ₩ lb 11½c net

**Blocks.**
Penfield Block Co., I. R. and I. Strap'd... } dis 40 %
Penfield Block Co., W. I. C. bushed... } dis 40 %
Penfield Block Co., W. I. all steel roll'r.. } dis 20 %
Penfield Block Co., L. & I Sheaves... } dis 40 %
Stanley Rule & Level Co.'s dis 40&10 %

**Bolts.**
Cast Iron Barrel Square, &c dis 55&10 %
Cast Iron Shutter Bolts dis 60&10 %
Cast Iron Chain (Sargent's list) dis 60&10 %
Ives' Patent Door Bolts dis 55&10 %
Wrought Barrel dis 55&10 %
Wrought Square dis 55&10 %
Wrought Shutter, all Iron, Stanley's list dis 50&10 %
Wrought Shutter, Brass Knob, Stanley's list dis 50&10 %
Wrought Shutter, Sargent's list dis 55&10 %
Wrought Sunk Flush, Sargent's dis 75&10 %
Wrought Sunk Flush, Stanley's dis 40&10 %
Wrought B. K. Flush, Com'n Stanley's dis 55&25&5 %
Carriage and Tire Common dis 80&15 %
Carriage and Tire, Philadelphia, new list dis 70 %
Carriage and Tire, Philadelphia Pattern dis 70 %
Union Carriage dis 70 %
R. B. & W. Carriage (old list) dis 70 %
Tire, Am. Screw Co.'s, Phila., new list, July 2 1883 dis 80 %
Tire, "Bay State," new list, July 2, 1883 dis 95 %
Tire, R. B. & W., new list dis 75&10 %
Stove—American Screw Co.'s dis 40 %
Stove, R. B. & W. dis 40 %
Stove, R. & E. Mfg. Co. dis 40 %
Plow dis 50 %
Plow, R. B. & Co. dis 45 %
Machine dis 50&10 %
Bolt Ends dis 60&10 %

**Borax.** 10c ₩ lb net

**Boring Machines.**

| | Upright | Angular |
|---|---|---|
| First quality, no Augers | $4.50 | $4.75.. dis 45@50 % |
| Phillips, with Augers | 7.00 | 7.50..... net |
| Jennings ₩ 100, no Augers | 5.50 | 5.75..... dis 40 % |

Saunders' Patent, Regular Bed, $6.00 dis 20 %
Saunders' Patent, Extra Bed, $9.50 dis 20 %

**Braces**
Q. S. Backus dis 60&5 %
Barber's dis 40&5 %
Sheffard's Patent dis 50&5 %
Ives' Patent Braces dis 55@55&5 %
Common Ball (American) dis 55 %
Amidon's dis 50 %
Barker's Imp'd dis 30 %
Empire dis 30 %
Buffalo Ball dis 40 %

**Brackets.**
Shelf, plain dis 50&10 %
Shelf, fancy dis 60&10 %
Reading, Plain dis 55&10 %
Reading, Rosette dis 55&5&10 %

**Bright Wire Goods.**
List of June 25, '83 dis 70&10&— %

**Bull Rings.**
Union Nut Co. dis 55 %
Sargent's dis 50&10 %
Hotchkiss' low list dis 15 %
Hunnason, Beckley & Co.'s dis 66⅔&10 %
Cook, Stow & W. Co.'s dis 33⅓ & 10 %

**Butts.**
Wrought Brass dis 50&10&5 %
Cast Brass "Hoops" dis 45&5 %
Cast Brass, Corbin's Fast Joint dis 20&10 %
Cast Brass, Loose Joint dis 10&10 %
Fast Joint, Narrow dis 45&10&10 %
Fast Joint, Broad dis 45&10&10 %
Loose Joint dis 55&10&10 %
Loose Joint, Japanned dis 55&10&10 %
Loose Joint, Japanned with Acorns dis 55&10&10 %
Parliament Butts dis 55&10&10 %
Mayer's Hinges dis 60&10&10 %
Loose Pin, no Acorn dis 55&10&10 %
Loose Pin, Acorns d's 55&10&10 %
Loose Pin, Acorns, Japanned dis 60&10&10 %
Loose Pin, Acorns, Japanned, Plated Tips dis 60&10&10 %

WROUGHT IRON.

Fast Joint, Narrow dis 50&10 %
Fast Joint, Lt. Narrow dis 50&10 %
Fast Joint, Broad dis 50&10 %
Loose Joint, Broad dis 55&10 %
Table Butts, Back Flaps, &c dis 50&10 %
Inside Blind Regular dis 50&10 %
Inside Blind, Light dis 50&10 %
Loose Pin, Wrt dis 55&10 %
Loose Pin, Light dis 50&10 %

**Spring Hinges:**
Geer's Spring and Blank Butts dis 25 %
Sabin Mfg. Co.'s Double Acting dis 35 %
Union Spiral Spring, Japanned dis 25 %
Union Spring Hinge Co.'s dis 25 %
American Spring Hinge Co.'s dis 35 %
Gem Spring Hinges dis 30 %
Barker's Double Acting dis 20 %
Union Mfg. Co. dis 25 %
Bommer's dis 25 %
Buckman's dis 25 %
Empire dis 50&10 %
Acme dis 55&10 %
Climax dis 50&10 %
Bling Butts Parker dis 70&2 %
Blind Butts, Palmer dis 50&10 %
Blind Butts, Seymour dis 70&2 %
Blind Butts, Lull & Porter dis 75&10 %
Blind Butts, Nicholson dis 45&10 %
Blind Butts, Huffer dis 50 %
Blind Butts, Clark's, Nos. 1, 3, 5 d's 70&2 %
Blind Butts, Sargent's, Nos. 1, 3 dis 66⅔&10 %
Blind Butts, Sargent's, No. 12 dis 70&10 %
Shepard's Reversible Shutter Hinges dis66⅔&10 %
Blind Butts, Reading's Gravity dis66⅔&10 %
Blind Butts, Shepard's "Noiseless," Nos. 40, 60, 65, 45 and 55 dis 70 %
Blind Butts, Shepard's "Noiseless," Nos. 050 and 060 dis 70&10 %
Shepard's Lull & Porter Shutter Hinges dis 70&10 %
Shepard's Reversible Shutter Hinges dis 70&10 %
Clark's Improved Shutter Hinge, Nos. 0, 1, 1½, 2, 2½, 3 dis 60&10 %

**Bow Pins.**
Humason, Beckley & Co.'s, Nos. 1 and 2 dis 60 %
Humason, Beckley & Co.'s other Nos dis 66⅔&10 %
Sargent & Co.'s $19.70 and $21.40, dis 66⅔&10 %
Hotchkiss dis 25 %
Peck, Stow & W. Co. dis 30&10 %

**Butcher's Cleavers.**
Humason & Beckley Mfg. Co. dis 25 %
Bradley's dis 25 %
Beatty's dis 25&5 %

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| $16.50 | 19.00 | 21.50 | 24.00 | 27.00 | 30.00 | 33.50 | 36 50 |

**Calipers** see Compasses

**Can Openers.**—Messenger's Comet, ₩ doz, $3.00 dis 25 %
American ₩ gross $6.00, dis 25@30 %
Duplex ₩ doz 25c, dis 15@20 %
Lyman's ₩ doz $3.75, dis 20 %
No. 4, French ₩ doz $2.25, dis 55 %
No. 5, Iron Handle ₩ gross $6 00, dis 25@30 %
Eureka ₩ doz $2.50, dis 10 %
Sardine Scissors ₩ doz $7.00, dis 55 %
Star ₩ doz $5.00, dis 25&55 %
Sprague, No. 1, $2.00; No. 2, $2.25; No. 3, $2.50 dis 10 %
"Worlds Best" ₩ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $30.00 dis 50 & 10 %
Universal ₩ doz $3.00, dis 35 %
Domestic ₩ doz $2.50, dis 45 %
Champion ₩ doz $2.00, dis 50 %

**Caps—Percussion,** ₩ 1000.
Hicks & Goldmark's
F. L. Waterproof, 1-10's 50c
E. B. Trimmed Edge, 1-10 s. 65c
E. B. Ground Edge, Central Fire, 1-10's 70c
Double Waterproof, 1-10's $1.10
Pistol Waterproof, 1-10's 75c
Musket Waterproof, 1-10's 50c
G. D. & S. B. 33c, dis 10 %
U. M. C., F. C. trimmed 50c
U. M. C., F. L. ground 70c } dis 10&5 %
U. M. C., Cen. fire ground 70c
U. M. C., Double W. Proof $1.40 }
Double Waterproof, in 1 10's $1.40 } dis 10 %
Colt's Pistol, in 1-10's 75c }
F. L. 50c
E. B. 1-10, trimmed 65c } dis 10&5 %
E. B. 1-10, ground edge 70c }
Musket, in 1-10's 80c, dis 25 %

**Cartridges.**—Rim dis 70 %
Central Fire dis 45@50 %

**Cards.**—Horse and Curry dis 10 %
Cotton new list, Aug., '83, dis 10 %
Wool new list, Aug. '83 dis 10 %

**Carpet Stretchers.**
Cast Steel, Polished ₩ doz $4.00, dis 30 %
Cast Iron, Steel Points ₩ doz $2.00, dis 50&— %
Socket ₩ doz $2.50, dis 25 %
Bullard's dis 25 %

**Casters.**—Bed dis 45@50 %
Plate 45@50 %
Shallow Socket dis 35&10 %
Deep Socket dis 33⅓ %
Martin's Patent (Phœnix) dis 25 %

**Cattle Leaders.**
Humason, Beckley & Co.'s dis 70&10 %
Sargent's dis 70&10 %
Hotchkiss dis 25 %
Peck, Stow & W. Co. dis 33⅓&10 %

**Chain.**
Trace, 5/16-10-2 ₩ pair 79c
Trace, 5/16-10-3 ₩ pair 70c } dis 35 %
Trace, 5/16-10-2 ₩ pair 80c }
German Halter Chain, list of Dec. 31, 1881 dis 55 %
German Coil, list of Dec. 31, 1881 dis 55 %
Covert Halter, Hitching and Breast dis 35&5 %
Oneida Halter Chain (old list) dis 45 %
Galvanized Pump Chain ₩ lb 9½c net
Jack Chain, Iron dis 60&10 %
Jack Chain, Brass dis 50&10 %

**Chalk.**
White ₩ gross 60c net
Red ₩ gross 80c net
Blue ₩ gross $1.00 net
White Crayons ₩ gross 10c net

**Chalk Lines.**—See Lines.

**Chisels.**
Socket Framing, Crossman dis 65&5 %
Socket Framing, Arlington Edge Tool Co dis 65&10 %
Socket Framing, Buck Bros. 1876 list, dis 22½ %
Socket Framing, Merrill dis 65&10 %
Socket Framing, Witherby Tool Co. dis 65&10 %
Socket Framing, Douglass' dis65&10 %
Socket Firmers, Crossman dis 65&5 %
Socket Firmers, Arlington Edge Tool Co. dis 65&10 %
Socket Firmers, Buck Bros. dis 50 %
Socket Firmers, Merrill dis 65&10 %
Socket Firmers, Witherby Tool Co. dis 65&10 %
Socket Firmers, Douglass' dis 65&10 %
Socket Corner dis 65&10 %
Tanged Firmers dis 40@45 %
Tanged Firmers, Butcher's $5.00@$5.25 to £
Tanged Firmers, Spear & Jackson's 5.00 to £
Tanged Firmers, Buck Bros (Shank) 5.25 to £
Globe Mfg. Co. dis 65&10 %

**Clamps.**
Iron, Providence Tool Co.'s Wrt. Iron dis 25 %
Iron, Adjustable, Gray's dis 20 %
Iron, Adjustable, Lambert's dis 20 %
Iron, Adjustable, Snow's dis 40&5 %
Iron, Adjustable, Hammer's dis 15 %
Iron, Adjustable, Stearns' dis 20&10 %
Iron, Cabinet, Sargent's dis 70&10 %
Iron, Carriage Makers', Sargent's dis 65&10&10 %
Saw Clamps See Vises

**Clips, Axle.**
Norway or Best dis 60&5 %
Superior dis 60&5 %

**Cockeyes.** dis 55 %

**Cocks, Brass.**
Racking
Globe
Plain Bibbs dis. 55 %
Ale and Beer

**Coffee Mills.**
Board and Box dis 50 %
Wilson's dis 50 %
Selsor's rat $9.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.) dis 20&10 %
The "Swift" (Lane Bros.) dis 20&10 %
Webb's Patent dis 45@50 %

**Compasses, Dividers, &c.**
Compasses dis 55 %
Calipers dis 55 %
Dividers dis 55 %
Berris & Call Co.'s Dividers dis 60&5 %
Bem s & Call Co 's Compasses and Calipers dis 50&5 %
Bemis & Call Co.'s Wing & inside or outside dis 50&5 %
Bemis & Call Co.'s Double dis 60 %
Bemis & Call Co.'s (Call's Patent Inside) dis 50 %
Excelsior dis 50 %
Cook's Extension dis 25 %
J. Stevens & Co s Calipers and Dividers dis 25&10 %

**Coopers' Tools.**
Bradley's dis 10 @ 20 %
Barton's d.s 20 %

**Corkscrews.**—Humason & Beckly Mfg. Co. dis 33⅓ %
Clough's Pat dis 33⅓ %

**Corn Knives and Cutters.**—Bradley's dis 10 %
Wadsworths dis 25 %

**Crow Bars.**
Cast Steel ₩ lb 6½c
Iron, Steel Points ₩ lb 5 c

**Curling Irons, &c.**
⅝, ¾, ⅞ in., $1.80, 2.00, 2.40 dis 10 %
Curling Tongs ₩ doz $3.65, dis 10 %
Pinching Irons ₩ doz $7.50, dis 20 %

**Curry Combs.**
Fitch's dis 50&10 %
Hotchkiss, Novelty, new list, July 1880 dis 25 %
Hotchkiss, Excelr. Supr. Champion dis 25 %
Rubber ₩ doz $10.00, dis 25 %

**Curtain Pins.**
Silvered Glass net
White Enamel net

**Cutlery.**
Meriden Cutlery Co. (Table) net
Am. Miller Bro.'s Cutlery Co dis 25 %
Humason & Beckley, Pocket dis 33⅓ %
Naugatuck Cutlery Co list net
Aaron Burkinshaw's Pocket dis 25 %

**Dividers** see Compasses

**Dog Collars.**—Embossed Gilt dis 30&10 %
Leather dis 40 %
Brass dis 40 %

**Door Springs.**
Torrey's Rod, regular size, ₩ doz., $3 dis 50 %
Gray's Rod dis 15 %
Bee Rod dis 15 %
Warner's dis 30 %

**Dem (Coil):**
No. 1, Large Japanned ₩ doz $1.00 }
No 2, Medium, Japanned ₩ doz 2.75 } dis 50 & 10 %
No. 3, Small, Japanned ₩ doz 2.00 }

**Star (Coil)**—For Cop'd, Nickel-Plated &c., see list.
No. 4 ("Shoo Fly") Screen door size, ₩ doz $1.50 }
No. 5, Screen Door size ₩ doz 2.00 } dis 60 %
No. 6, Medium ₩ doz 2.75 }
No. 7, Large ₩ doz 4.00 }
Sabin's Lever..No. 1, $1; 2, $1.50; 3, $2; 4, $2.50 dis 35 %
Sabin's Boss. No. 1, ₩ doz. $4.00; 2 $2.75; 3, $2.dis 33⅓ %
Star Crown ₩ doz $1.50, dis 33⅓ %
Philadelphia 5 in., $8.00; 8 in., $7.75, dis 35 %
Cowell's No. 1, ₩ doz. $18.00; No. 2, $15.00, dis 40 %
Rubber, complete ₩ doz. $2.25, dis 10 %
Hercules dis 50 %

**Drawing Knives.**
Arlington Edge Tool Co. dis 65&10 %
Crossman's No. 1 dis 65&5 %
Morrill dis 65&10 %
Nobles Mfg. Co. dis 15 %
Bradley's dis 35 %
Adjustable Handle dis 20 %
Witherby Tool Co. dis 65&10 %
Douglass dis 65&10 %
Globe Mfg. Co. dis 65&10 %

**Drills and Drill Stocks.**
Blacksmiths' each, $2.50, dis 20 %
Blacksmiths' Self-Feeding each, $7.50, dis 20 %
Breast, P. S. & W. dis 20&10 %
Breast, Hotchkiss' dis 20 %
Breast, Wilson's dis 20 %
Breast, Millers Falls each, $3.00, dis 25 %
Breast, Bartholomew's each, $2.50, dis 25&10 %
Ratchet, Merrill's dis 20 %
Ratchet, Ingersoll's dis 25 %
Ratchet, Whitney's dis 20 %
Ratchet, Weston's dis 20 %
Ratchet, Moore's Triple Action dis 20&25 %
Whitney's Hand Drill, Plain, $11.00 Adjustable, $12.00 dis %
Wilson's Drill Stocks dis 10 %
Automatic Boring Tools each, $7.25, dis 20 %

**Drill Chucks.**
Morse's Beach Patent dis 30 %
Morse's Adjustable each, $10.00, dis 30 %
Danbury each, $8.00, dis 30 %

**Egg Beaters.**
Dover ₩ doz. $2.50, dis 2 %
Monroe's dis 50 %
National ₩ doz. $4.50, dis 33⅓ %
Standard ₩ gross, $18.00, dis 25 %
Family (T. & S. Mfg. Co.) ₩ gross, $18.00, net
Acme ₩ gross, $12.00, dis 25 %
Triumph (T. & S. Mfg. Co.) ₩ gross, $11.50, net

**Elevator Buckets.**
Mill E. Buckets, light, 3½ to 10 in (Duc's Improved). ₩ 100, $15 00 @ $54.00 dis 10 %
Mill E. Buckets, heavy 5 to 10 in. (Duc's Improved), ₩ doz. $5.00 @ $10.20 dis 10 %
Storehouse (Duc's Patent), 12 to 17, $12 @ $20 dis 10 %

**Emery and Emery Paper.**
Regular numbers ₩ lb 6c
Flour and F. F. ₩ lb 4c
R. & A. Emery Paper dis 30&5 %
Sibley's Emery and Crocus Cloth, large size, $10; medium, $7.50 ₩ ream dis 15 %

**Enameled and Tinned Ware.**
Kettles dis 50 %
Sauce Pans dis 25 %
Tinned Sauce Pans dis 25 %

**Escutcheon Pins.**
Brass dis 50 %

**Escutcheons.**
Door Lock..... Same discounts as Door Locks
Brass Thread dis 55 %
Wood dis 25 %

**Faucets.**
Fenn's dis 40 %
Bohren's Patent Rubber Ball dis 25 %
Fenn's Cork Stops dis 33⅓ %
Star dis 55&10 %
Frary's Patent Petroleum dis 20&10 %
West's Patent Key dis 45 %
Ancher Lock dis 45 %
Metallic Key, Leather Lined dis 60 %
Cork Lined dis 70 %
J. Sommer's Best Metallic Key dis 30&10 %
J. Sommer's Cork Lined, 1st quality dis 50 %
J. Sommer's Spring, Enterprise ₩ doz. $30.00, dis 20&10 %
Self-Measuring, Lane's ₩ doz. 36.00, dis 20&10 %
Self-Measuring, Victor ₩ doz. $36.00, dis 20&10 %

**Fellee Plates** ₩ lb, 10c, dis 25 %

**Files.**
J. & Riley Carr new list April 1, '83, dis 15 %
J. & Riley Carr Horse Rasps dis 10 %
Butcher's
Moss & Gamble new list, dis 15 %
H. Disston & Sons dis 45 %
Nicholson dis 45 %
New American dis 45 %
Union File Co. dis 45 %
Heller Bros.' Files dis 45 %
Heller Bros.' Horse Rasps dis 35 %
Western dis 45 %
Stubs new list, dis 75@30 %

**Fluting Machines.**
Knox, 4½-inch Rolls $3.50 each }
Knox, 6-inch Rolls $4.00 each } dis 35 %
Eagle 3½ inch Roll $2.15, dis 35 %
Eagle, 5½-inch Roll 2.85, dis 35 %
Crown, 4½-in., $3.50; 6-in., $4.00; 8-in., $6.50 each, dis 35 %
Crown, Jewel, 6-in., $3.50 each, dis 35 %
American, 5-in., $3; 6-in., $3.40; 7-in., $4.50 each, dis 35 %
Domestic Fluter $1.50 each, net
Geneva Hand Fluter, White Metal ₩ doz $12, dis 25 %
Crown Hand Fluter, Nos. 1, $15; 2, $12.50; 3, $10.00 ₩ doz. dis 30 %
Shepard Hand Fluter, No. 85 per doz $15, dis 40 %
Shepard Hand Fluter, No. 110 per doz $8.75, dis 30 %
Shepard Hand Fluter, No. 95 per doz $6.50, dis 20 %
Clark's Hand Fluter ₩ doz $15.00, dis 33⅓ %
Combined Fluter and Sad iron ₩ doz $15.00, dis 30 %
Buffalo ₩ doz $10.00, dis 10 %

**Fluting Scissors** dis 45 %

**Fly Traps.**
Paragon ₩ doz, $3, net

**Forks.**
Hay, Manure and Spading dis 50 %
Plated, A 1, Rogers & Bro. dis 40&10&5 %
Plated, Reed & Barton dis 40&10&5 %

**Fruit and Jelly Presses.**
Enterprise Mfg. Co. dis 20&10 %

**Fry Pans.**
Burnished list as follows dis 60&10&5 %

| No | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| ₩ doz | $3.00 | 3.75 | 4.25 | 4.75 | 5.25 | 6.00 | 7.00 | 8.00 | 9.00 |

"Acme" dis 40&10 %

**Gauges.**
Marking Stanley's dis 50&10 %
Marking, Chapin's dis 55&10 %
Wire dis 10&10 %
Wire, Disston's dis 20 %
Wire, Wheeler, Madden & Co dis 10 %

**Gimlets.**
Nail and Spike dis 40&10 %
"Eureka" Gimlets dis 40&10 %
"Diamond" Gimlets dis 10&10 %
Double Cut, Shepardson's dis 40&10 %
Double Cut, Hartwell's dis 20&10 %
Double Cut, Ives' dis 40&10 %
Double Cut, Douglass' dis 40 %
"Bee" ₩ gro. $12.00, dis 25 %

**Gas Pots.**
Tinned and Enameled dis 25&5 %
Family, Howe's "Eureka" dis 25 %
Family, L. F. & C.'s "Handy" dis 30 %

**Grindstone Fixtures.**
Sargents' Patent dis 70&10 %
Reading Hardware Co. dis 30&10 %

**Gun Wads.**
U. M. C. B. E., 11 up $2.00 }
U. M. C. B. E., 9&10 2.30 }
U. M. C. B. E., 7&8 2.50 } dis 5&5 %
U. M. C. P. E., 11 up 3.10 }
U. M. C. P. E., 9&10 4.00 }
U. M. C. P. E., 7&8 4.90 }

**Halters.**
Covert's Pat. Rope dis 50 %
Covert's Horse and Cattle Ties dis 50 %
Union Pat. Rope and Web dis 50&10 %
Union Horse and Cattle Ties dis 40&10 %

**Hammers.**
Maydole's dis 15 %
Cheney's, new list, March, 1883 dis 20&5 %
Hartford Hammer Co. (new list July 1, '81) dis 20 %
Humason & Beckley dis 15 %
Verree dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.26, 1.50 and 1.75, dis 25&10 %
Nelson Tool Works dis 40&10 %
Warner & Noble's dis 5 %
Yerkes & Plumb dis 30 %
Wilkinson's Smiths' 11½c ₩ lb net

**Hand Cuffs and Leg Irons.**
Providence Tool Co., Hand Cuffs, $10.00 ₩ doz. dis 10 %
Providence Tool Co., Leg Irons, $25.00 ₩ doz dis 10 %
Tower's dis 25 %

**Handles.**—Door or Thumb Latches.

| Nos | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Per doz | $0.80 | 1.00 | 1.18 | 1.35 | 1.65 |

dis 60&10 %

Roggin's Latches ₩ doz 35c. @ 40c. net
Bronze Iron Drop Latches ₩ doz $0.80 @ 0.90 net
Jap'd Store Door Handles—Nuts, $1.62; Plate, $1.10; no Plate, $0.88 net
Barn Door ₩ doz $1.60, dis 10&10 %
Wrought Chest dis 70 %
Surface Chest dis 60&10 %
Flush Chest dis 60&10 %
Lifting dis 70 %
Saw and Plane dis 60&10 %
Boynton's Loop Saw Handles 50c, dis 10 %
Boynton's Centennial Saw Handles 30c, dis 25 %
Hammer and Hatchet dis 20 %
Brad Awl ₩ gross, $2.50 dis 10 %
Hickory Firmer Chisel, assorted, ₩ gross, $1.50 }
Hickory Firmer Chisel, large, ₩ gross 5.00 }
Apple Firmer Chisel, assorted, ₩ gross 5.00 } dis
Apple Firmer Chisel, large, ₩ gross 6.00 } 20&10
Socket Firmer Chisel, assorted, ₩ gross 3.00 } @
Socket Framing Chisel, assorted, ₩ gross 5.00 } 25&10
File assorted, ₩ gross 2.75 }
Auger, assorted, ₩ gross 5.50 }
Auger, large, ₩ gross 7.00 }
Patent Auger, Ives' dis 20 ₩ 10 %
Patent Auger, Douglass' ₩ set $1.25 net
Patent Auger, Swan's ₩ set $1.00 net

**Hangers.**
Barn Door, old patterns dis 60&10 %
Barn Door, New England dis 55&10 %
Climax (Anti-Friction) dis 50 %
Challenge dis 50 %
"Champion" Medina Mfg. Co. $15; dis 50&10 %
Sterling Improved (Anti Friction) dis 65&10 %
Cheritree dis 50 %
Kidder's dis 50&5 %
U. S 4 in., $12; 5 in., $15; dis 60 %
The "Boss" dis 50&10 %
Terry's Patent 5 in., $12; 5½ in., $10; dis 40 %
Cronk No. 4, $12; No. 5, $14 40; No. 6, $21; dis 50

**Harness Snaps.**
Anchor (T. & S. Mfg. Co.) dis 60 %
Henshaw's, list of 1½ changed to $14.00 dis 60 %
Judd's, list of 1½ changed to $14.00 dis 60 @ 65 %
Fitch's (Bristol), list of 1½ change to $14.00 dis 60 @ 65 %
Hotchkiss' dis 10 %
Andrews' dis 50 %
Sargent's dis 70&10 %
German, low list, Sep., 1882 dis 33⅓ %
German, Sargent's new list dis 60&10 %
Covert dis 50 %
Covered Spring, new list, Oct., 1882 dis 60&10 %
Union dis 50&10 %
Union Improved German dis 50&10 %

**Hatchets.**
Isaiah Blood dis 30 @ 35 %
Shingling, Nos. 1 2 3 ₩ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3 ₩ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3 ₩ doz 7.50 8.00 8.50
Hunt's dis 25 %
Shingling, Nos. 1 2 3 ₩ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3 ₩ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3 ₩ doz 7.50 8.25 9.00
Hurd's dis 30 @ 35 %
Shingling, Nos. 1 2 3 ₩ doz $8.00 $8.50 $9.00
Claw, Nos. 1 2 3 ₩ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3 ₩ doz 8.00 8.50 9.00
Yerkes & Plumb dis 30 @ 35 %
Shingling, Nos. 1 2 2 ₩ doz $7.50 $8.00 $8.50
Claw, Nos. 1 2 3 ₩ doz 8.25 8 75 9.25
Lathing, Nos. 1 2 3 ₩ doz 7.50 8.00 8.50
Simmons' dis 30 @ 35 %
Shingling, Nos. 0 1 2 3.. ₩ doz $7 50 $8.00 $8.50 $9.00
Claw, Nos. 0 1 2 3.. ₩ doz .... 8.50 9.00 9.50
Lathing, Nos. 0 1 2 3.. ₩ doz .... 8.00 8.50 9.00
Broad, Nos. 1 2 3 4.. ₩ doz 9.00 10.00 12.00 14.00
Broad, Nos. 5 6 7 8.. ₩ doz 16.00 18.00 20.00 22.00
Collins dis 10 %
Shingling, Nos. 1 2 3 ₩ doz $5.50 $6.00 $6.50
Claw, Nos. 1 2 3 ₩ doz 6.00 6.50 7.00
Lathing, Nos. 1 2 3 ₩ doz 5.50 6.00 6.50
Peck's Champion Blade dis 30 @ 35 %
Shingling, Nos. 1 2 3 ₩ doz $8.00 $8.50 $9.00
Lath, Nos. 1 2 3 ₩ doz 8.00 8.50 9.00
Claw, Nos. 1 2 3 ₩ doz 9.00 9.50 10.00
Half, Nos. 1 2 3 ₩ doz 8.00 8.50 9.00
Ax Pattern, Nos. 1 2 3 ₩ doz 10.00 11.00 12.00

**Hay Knives.**
"Lightning" ₩ doz $20.00 dis 15 %
Wadsworth's dis 33⅓ %

**Hinges.**
Gate, Western. ₩ doz $4.00 dis 55 %
Gate, N. E. ₩ doz $7.70, dis 55 %
Gate, N. E. Reversible ₩ doz $6 75, dis 55 %
Gate, Clark's, Nos. 1 2 3 dis 50 %
Gate, N. Y. State ₩ doz $6 00, dis 55 %
Gate, Automatic ₩ doz $12.50, dis 50 %
Gate, Common Sense ₩ doz pair $4 50, dis 50 %
Gate, Seymour's dis 45&10 %
Gate, Shepard's Nos. 1, 2, 3, 10, 20 & 25, dis 50&10 %
Rolled Blind Hinges dis 60&10 %
Rolled Plate dis 60&10 %
Rolled Raised dis 60&10 %
Plate Hinges 8, 10 & 12 in., $5.55 ₩ 100 lb } dis 10 %
"Providence" over 12 in., $

Spring.....₩ do $7.00, dis 50&7½ %
Spring, Leach's Patent.....dis 15 %
Bemis & Call Co.'s Spring and Check.....dis 40 %
Solid Tinners'.....₩ doz $1.44. dis 40 %

**Rail.**
Sliding Door, Wrought Brass. ₩ ℔ 43c. dis 33⅓ %
Sliding Door, Bronzed Wrt. Iron....₩ foot 12c. dis 33⅓ %
Sliding Door, Iron, Painted.....₩ foot 4c. dis 10&10 %
Barn Door....Inch ..... ½ ¾ ⅞
Per 100 feet $2.60 3.60 4.60—dis 10 %
B. D. for N. E. Hangers—
Small. Med. Large.
Per 100 feet.....$2.10 2.70 .30—net
Terry's Wrought Iron, 50c ₩ foot. net

**Razors.**
J. R. Torrey Razor Co. .....dis 15 %

**Razor Strops.**
Genuine Emerson.....dis 45 %
Badger's (not Emerson).....dis 33⅓ %
Imitation Emerson.....₩ doz $2.00, dis 2- %
Hunt's.....dis 40&5 %
Chapman.....dis 15 op 2 %
Saunder's.....dis 10 %
Torrey's.....dis 20 %

**Rivets.**
Iron and Tinned, new list, Dec. 10, 1881. .....dis 40 %
In bulk, new list, Dec. 10, 1881.....dis 10 %
Copper Rivets and Burrs .....dis 50 %
Nos.. 7 8 9 10 11 12 13 14 15
₩ ℔.. 49c 50c 52c 54c 56c 58c 60c 65c 70c

**Rivet Sets.**.....dis 33⅓&10 %

**Rods.**
Stair, Brass .....dis 25 %
Stair, Black Walnut.....60c. ₩ doz. dis 10 %

**Rollers.**
Barn Door, Sargent's list..... dis 6c&10&10 %
Acme (Anti-Friction).....dis 50 %

**Rope.**
Mnfs' List, August 3, 1883..... dis 1c ₩ ℔
Manila.....½ inch and larger ₩ ℔ 15½c
Manila.....⅜ inch ₩ ℔ 16 c
Manila.....¾ and 5-16 inch ₩ ℔ 16½c
Manila, Tar'd Rope.....₩ ℔ 15 c
Manila, Tar'd Lath Yarn.....₩ ℔ 15 c
Manila, Hay Rope.....₩ ℔ 15½c
Sisal.....½ inch and larger ₩ ℔ 10½c
Sisal.....⅜ inch ₩ ℔ 11 c
Sisal.....¾ and 5-10 inch ₩ ℔ 11½c
Sisal, Hay Rope .....₩ ℔ 10 &c

**Rules.**

| | Boxwood. | Ivory. |
|---|---|---|
| Chapin's | dis 70&10 % | dis 40@55% |
| Standard | | |
| Stanley | | |
| Stephens | dis 70&10 % | dis 45% |

**Sad Irons.**
From 4 to 10.....₩ ℔ 3½c net
Self-Heating.....₩ doz $9.00 net
Self-Heating, Tailors'.....₩ doz $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Mrs. Pott's Irons, Doubled Pointed.....dis 35 %
Mrs. Pott's Irons, Square Back.....dis 35 %
Enterprise Star Irons, new list, July 20, 1882...dis 35 %
Combined Fluter and Sad Iron....₩ doz $14.00, dis 15 %
Chinese Laundry (N. E. Butt Co.).....dis 15%
New England.....50 dis 15 %

**Sand Paper.**
Baeder & Adamson's Flint, 00 to 1½ ..$4.50 ₩ ream
Baeder & Adamson's Flint, 2, 2½ & 3. 5.00 ₩ ream
Baeder & Adamson's Flint, Assorted. 4.75 ₩ ream
Baeder & Adamson's Star.....3.75 ₩ ream
Baeder & Adamson's Emery..₩ ream $6.50 @ 11.50
Bartles Flint.....$4.75&$5.25 ₩ ream dis 35 %
Bartles Harrison, $4.75 ₩ ream.....dis 35 %
New England same list as B. & A. Flint.....dis 35 %
Gage's.....dis 30&5 %

**Sash Cord.**
Common.....₩ ℔ 13c net
Patent.....₩ ℔ 15c net
Silver Lake, Hemp.....₩ ℔ 50c, dis 10&5 %
Silver Lake, White Cotton.....₩ ℔ 50c, dis 10&5 %
Silver Lake, Drab Cotton.....₩ ℔ 55c, dis 10&5 %
Raw Hide, ₩ foot, ¼ in., 5c.; 5-16 in., 7c.; ⅜ in., 10c. dis 15 %
Steel Ribbon.....dis 10 %

**Sash Locks.**
Clark's, No. 1, $10.00; No. 2, $8.00 per gross.....dis 33⅓ %
Ferguson's.....dis 33⅓ %
Walker's.....net
Hammond's Window Springs.....dis 25 %
Northup Window Springs, No. 1, $10.00 ₩ gr.08...dis 15 %
"Common Sense," Japanned, Coppered and Bronzed. ₩ gross $5.00 net
Common Sense," Nickel Plated..₩ gross $10 00 net
Universal".....dis 30 %

**Sash Weights.**
Solid Eyes, in 500 ℔ lots and over.....₩ ℔ 1¾cnet

**Sausage Stuffers or Fillers.**
Miles "Challenge".....₩ doz $20, dis 40 %
Perry.....₩ doz. No. 1½; No. 0, $21, dis 25&10 %
Draw Cut No. 4.....each $30.00, dis. 20 %
Enterprise Mfg. Co.....dis 25%
Silver's.....dis 25 %

**Saws.**
Disston's Circular, Mill and Cross Cut.....dis 40 %
Disston's Hand, Panel, Rip, &c.....dis 20 %
Boynton's Lightning Cross Cuts, new list.....dis 40 %
Boynton's Circular and Mill.....dis 40 %
Boynton's Ice.....dis 25 %
Boynton's Lightning Hand, Panel and Rip.....dis 25 %
Wheeler & Clemson Mfg. Co.'s Hand.....dis 30 %
W. M. & C. Mfg. Co. Cross Cuts.....dis 30 %
Livingston's Butcher and Kitchen.....dis 20 %
Livingston's Framed Wood—
Nos.. 101 102 103 104 105
Per doz....$10.00 8.50 10.00 7.50 6.20 net
Peace Circular and Mill.....dis 40 %
Peace Hand, Panel and Rip.....dis 25 %
Peace Cross Cuts.....dis 35 %
Peace Band Saws, all widths.....dis 10 %
Richardson's Circular .....dis 40 %
Richardson's Mill and X Cut.....dis 40 %
Richardson's Hand Panel, Butcher and Web Saws.....dis 25 %

**Saw Fremes.**
White, Vermont.....₩ doz $1.50. dis 25&10%
Red, Polished and Varnished.....₩ doz $1.50, dis 10%
Saw Rods.....$10 list, dis10 & 10%

**Saw Sets.**
Boynton's Patent X Cut, per doz, $12.00; Hand Saw per doz, $10.00.....dis 25 %
Stillman's Genuine.....₩ doz $3.50 and $4.50 dis 10 %
Stillman's Imitation.....₩ doz $3.25, dis 30&10 %
Common Lever.....₩ doz $2.00, dis 30&10 %
Leach's.....No 0, $8.00; No. 1, $15.00, dis 15 %
Nash's.....dis 20&10 %
Hammer, Hotchkiss.....$5.50, dis 10 %
Hammer, Bemis & Call Co.'s new Patent.....dis 30&5 %
Bemis & Call Co.'s Lever & Spring Hammer..dis 30&5 %
Bemis & Call Co.'s Plate.....dis 10 %
Bemis & Call Co.'s Cross Cut.....dis 12½ %
Aiken's Genuine.....$13.00, dis 50&10 %
Aiken's Imitation.....$8.00, dis 55 %
Hart's Patent Lever.....dis 20 %
Disston's.....dis 20 %
Morrill's.....No. 1, $15 No. 0, $12, dis 40&5 %

**Scales.**
Hatch, Counter, No. 171.....₩ doz $42, dis 45 %
Hatch, Tea, No 161. .....₩ doz $14.00, dis 45 %
Union Platform.....$6.00, dis 45 %
Fairbanks'.....dis 20 %
Richie Bros.....dis 20 & 10 %
Buffalo Scale Co.....dis 20&5 %
Forsyth Scale Co.....dis 25 %
Howe's.....dis 20&10 %
Chatillon's Grocers'.....dis 40 %
Chatillon's Eureka.....dis 25 %
Family Universal, 12 ℔, $30; 24 ℔ $36.....net
Family Favorite.....dis 30 %
Family, Turnbull's.....dis 30 %
Scale Beams, List of January 12, 1882.....dis 4 &10 %

**Scrapers.**
Adjustable Box Scraper (S. R. & L. Co.), $6.50, dis 20&10%
Box 1 Handle.....₩ doz $4.00, dis 10 %
Box Handle.....₩ doz $6.00, dis 10 %
Defiance Box and Ship.....dis 20&10 %
Foot .....dis 50&10 %
Ship, common.....₩ doz $3.50 net
Ship, Providence Tool Co.....dis 10 %

**Screen Corners.**
Porter's Pat Windowand Door Frame..... dis 33⅓

**Screw Drivers.**
Douglas Mfg. Co.....dis 20&10&10 %
Disston's.....dis 40 %
Disston's Patent Excelsior.....dis 40 %
Buck Bros .....dis 25 %
Stanley Rule & Level Co.'s, Varnished Hdls..dis 6o&10 %
Stanley Rule & Level Co.'s, Black Handles..dis 50&10 %
Sargent & Co.'s.....dis 50&10 %
Gay's Double Action Ratchet
₩ doz. 4 in., $9.00; 5 in., $10.20; 6 in., $12.00—dis 35 %
Mallett & Co.'s Double Action Clutch
₩ doz, 4 in., $7.00; 5 in.. $8.00; 6 in., $9.00—dis 15 %
Champion.....dis 25 %
Clark's Patent.....dis 25 %

**Screws.**
Flat H'd Iron, new list, Dec 27, 1882.....dis 55 %
Round Head Iron, new list, Dec. 27, 1882.....dis 55 %
Flat Head Brass, new list, Dec. 27, 1882.....dis 55 %
Round Head Brass, new list, Dec. 27, 1882.....dis 45 %
Brass and Silver Capped.....dis 40 %
Japanned, list of Plain Screws.....dis 40&10 %
Coach, Patent Gimlet Point .....dis 70 %
Bed.....dis 14@40 %
Machine, Flat Head, Iron.....dis 55 %
Machine, Round Head, Iron.....dis 50 %
Bench, Iron.....dis 55&10 %
Bench, Wood, Beech.....₩ doz $3.00, dis 10 %
Bench, Wood, Hickory.....dis 20&10 %
Hand, Wood.....dis 25&10 %
Hand Rail, Sargent's.....dis 60&&10 %
Hand Rail, Humason, Beckley & Co.'s....dis 60&&10 %
Hand Rail, Am. Screw Co., list of Jan. 1, '81.....dis 70 %
Jack (Wilson's).....dis 25 %

**Screw Window Balances.**
R. B. Hugunin's, No. 1, $2.10; No. 2, $1.75; No 3 $1.60.....₩ doz net

**Scroll Saws.**
Lester, $10.00. .....dis 25 %
Rogers, $5.00. .....dis 25 %

**Shears and Scissors.**
American (Cast) Iron.....dis 70@75&10 %
Pruning.....see Pruning Hooks and Shears.
Garnard's Lamp Trimmers.....₩ doz $1.75
Tinners'.....add 6 %, dis 10 %
Seymour's, List, Dec., 1881.....dis 60 %
Heinsch's, List, Dec., 1881.....dis 60 %
Heinsch's Tailor's Shears.....dis 33⅓ %
Mass. Cutlery Co. St. Trimmers.....dis 75 %
Cast Steel Trimmers.....dis 50 %
Wiss, J., & Sons' list, Dec., 1881.....dis 50 %
Wiss, J., & Sons' Tailors' Shears.....dis 50 %

**Shovels and Spades.**
ames, New list, July 1, 1882.....dis 15"
Griffiths .....dis 50&5 %
Old Colony.....dis 15 %
Payne Pettebone & Son, new list.....dis 40&10 %
Payne Pettebone & Son, R. R. Shovels.....dis 15 %
emington's (Lowman's Patent)..... ..... dis 20 %
Rowland's ..... dl 50&5 %

**Shovels and Tongs.**
Iron and Brass Head, R. & E. list..... dis 60&10&2 %
Iron and Brass Head, P. S. & W.....dis 60&&10 %
Polished Steel, new list.. .....dis 50&10&2 %

**Slates.**
Square Frames, by case.....dis 70 %
Less than a case.....dis 60&10 %

**Spoke Shaves.**
Defiance Metallic.....dis 20&10 %
Iron.....dis 45 %
Wood.....dis 30 %
Bailey's (Stanley R. & L. Co.), new list.....dis 30&10 %
Stearns'.....dis 30&10 %

**Spoke Trimmers.**
Bonney's.....₩ doz $10.00, dis 40&5 %
Stearns'.....₩ doz $9.00, dis 20&10 %
Ives'.....No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 55&10 %
Douglass'.....₩ doz $9.00, dis 15 %

**Spoons.**
Basting.....dis 60&10 %
Solid Table and Tea.....dis 60 %
Britannia.....dis 60&10 %
Reed & Barton.....dis 40&10&5 %
Holmes, Booth & Haydens.....dis 40&10&5 %
German Silver.....dis 30&10&5 %
Cast Steel, Silver Plated.....dis 33⅓ %
Tin (P. S. & W.), Teas.....$1.25 ₩ gross, net
Tin (P. S. & W.), Tables.....$2.00 ₩ gross, net
Tin (Cowles Hdw. Co.).....dis 10 %
Tin (Cowles Hdw Co.), case lots.....dis 20 %

**Stocks and Dies.**
"Lightning" Screw Plate.....dis 10 %

**Stone.**
Hindostan No. 1, 6c; Axe, 8c..... .....dis 40 %
Sand Stone.....₩ ℔ 5c, dis 33⅓&10 %
Washita Stone .....No. 1, ₩ ℔ 18c net
Washita Stone.....No. 2, ₩ ℔ 16c net
Washita Stone, Slips.....No. 1, ₩ ℔ 37c net
Arkansas Stone No. 1. 4 to 6 in.....₩ ℔ $1.35 dis 10 %
Arkansas Stone No. 1. 6 to 9 in.....₩ ℔ $2.00 dis 1- %
Turkey Oil Stone (Chase)....4 to 8 in., ₩ ℔, 60c, dis 10 %
Turkey Slips (Chase).....$1.75 ₩ ℔ dis 10 %
Lake Superior (Chase).....₩ ℔ 16c, dis 10 %
Lake Superior, Slips (Chase).....₩ ℔ 30c, dis 10 %
Grindstones, Family, Loring's.....dis 10 %

**Stove Polish.**
Joseph Dixon's.....₩ gross $6.00, dis 10 %
Gem.....₩ gross $4.50, dis 10 %
Gold Medal.....₩ gross $6.00, dis 25 %
"Mirror".....₩ gross $6.00, dis 5 %
Lustro.....₩ gross $4.75, net
Ruby.....₩ gross $3.75, net
Rising Sun.....₩ gross $5.75, net
Dixon's Plumbago.....₩ ℔ 8c, net
Boynton's Noon Day ₩ gross No. 1, large, $6.50 No 2, small, $3 ;No. 3, medium, $4.

**Squares.**
Steel and Iron..... .....dis 50&10&2 %
Nickel Plated.....dis 50&10&2 %
Try Square and T Bevels.....dis 50&10 %
Disston's Try Square and T Bevels.....dis 40 %
Winterbottom's Try and Mitre.....dis 20&10 %

**Tacks, Brads, &c.**
New List, Sept. 1, 1882.
Tinned Swedes Tacks.....dis 30 %
Tinned American Tacks.....dis 30 %
Swedes Tacks, all kinds.....dis 30 %
American Cut Tacks.....dis 30 %
Copper Tacks and Nails.....dis 30 %
Swedes Hungarian Nails.....dis 35 %
Gimp and Lace Tacks.....dis 30 %
Gimp and Lace Tacks, Tinned.....dis 30 %
Finishing Nails.....dis 25 %
Trunk and Clout Nails.....dis 25 %
Common and Patent Brads.....dis 20 %
Basket Nails.....dis 20 %
Brush Tacks .....dis 20 %
Leathered Carpet Tacks.....dis 20 %
Cigar Box Nails.....dis 20 %
Chair Nails.....dis 20 %
Double-pointed Tacks.....dis 40& 5%
Extra 5 & 10 off.

**Tap Borers.**
Common and Ring.....dis 20 %
Ives' Tap Borers.....dis 15&10 %
Enterprise Mfg. Co.....dis 20&10 %

**Tapes, Measuring.**
American.....dis 25 %
Spring.....dis 25&10 %
Chesterman's.....regular list dis 20@25 %

**Thermometers.**
Tin Case.....dis 75&10 %

**Tobacco Cutters.**
Enterprise Mfg. Co. (Champion) .....dis 20&10 %
Wood Bottom.....₩ doz $10.00, dis 25&10 %
All Iron.....₩ doz $8.25, dis 35 %
Nashua Lock Co.'s.....₩ doz $18.00 dis 50&5% %
Wilson's.....dis 35 %
Clipper (Sargent & Co.).....₩ doz $18.00. dis 20 & 10 %

**Toe Calks.**
Winsted.....₩ ℔ 9c, dis c

**Tinners' Tools and Machines.**
Machines (P. S. & W.).....list add 20 %
Tools (P. S. & W.).....add 6 % } dis 10 %

**Transom Lifters.**
Wollensak's Patent.....dis 35 %
Reiher's Patent, new list, Feb., 1882.....dis 20&10&10 %
Excelsior.....dis 50&10&2 %

**Traps.**
Game, Newhouse.....dis 35 %
Game, Oneida Pattern.....dis 60 %
Game, Blake's Patent.....dis 40&5 %
Mouse, Wood, Choker.....₩ doz holes, 15c
Mouse, Round Wire.....₩ doz $1.50, dis 10 %
Mouse Cage, Wire.....₩ doz $2.50, dis 10 %
Mouse, Catch-em-alive.....₩ doz $2.50, dis 15 %
Mouse, "Bonanza".....per gross $10.00 net
Rat, "Decoy".....₩ doz $10.00, dis 10 %

**Trowels.**
Lothrops' Brick and Plastering.....dis 25 %
Reed's Brick and Plastering .....dis 15 %
Disston's Brick and Plastering.....dis 20 %
Peace's Plastering.....dis 25 %
Clement & Maynard's.....dis 20 %
Rose's Brick.....dis 15 %
Brades' Brick .....dis 25 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 55 %

**Triers.**
Butter and Cheese.....dis 25 %

**Trucks (Warehouse, &c.**
Penfield Block Co.'s list, 1882.....dis 40 %

**Vises.**
Solid Box.....dis 35 %
Solid "Crown" (A. H. Hildick).....40 to 100 ℔, 15c net
Solid, Peter Wright's.....15½c
Solid, Wilkinson's.....14@15c
Parallel, Parker's.....dis 10 %
Parallel, Wilson's.....dis 35&10 %
Parallel, Howard's.....dis 20&10 %
Parallel, Merrill's.....dis 15 @ 20 %
Parallel, Sargent's.....dis 50&10 %
Parallel, Backus and Union.....dis 40 %
Parallel, Oval Slide.....dis 40 %
Parallel, Double Screw Leg.....dis 15&10 %
Parallel, Prentiss.....dis 25 %
Parallel, Simpson's Adjustable.....dis 25&< %
"Family," List.....net
Saw Filers, Bonney's.....₩ doz $24.00, dis 20&10 %
Saw Filers, Stearn's.....dis 20&10 %
Saw Filers, Hopkins'.....₩ doz $17.50, dis 10 %
Saw Filers, Reading.....dis 40&10 %
Cowell Hand Vises.....dis 20 %
Richardson's Vise and Anvil.....dis 25 %

**Washer Cutters.**
Smith's Patent.....₩ doz $12.00, dis 25 %
Johnson's.....₩ doz $11.00, dis 33⅓ %
Penny's.....₩ dos Pol. $17.50; Jap'd, $16.50, dis %
Appleton's.....₩ doz $16.00, dis 60&10 %

**Washers.**—See Nuts and Washers.

**Well Wheels**.....dis 60&10 %

**Wire.**
Brass and Copper.....dis 33⅓ %
Market, Bright an Annealed .. .....dis 55 @ 57½ %
Market, Copper-d.....dis 50 @ 52½ %
Market, Galvanized.....dis 45 @ 47½ %
Market, Tinned, Tinned list..... .....d s 47½ @ 50 %
Stone, Bright and Annealed Nos. 0 to 18..dis 57½ @ 60 %
Stone, Bright and Ann aled Nos. 19 to 26...dis 60 @ 65 %
Stone, Bright and Annealed Nos. 27 to 36..dis 62½ @ 70 %
Stone, Galvanized Nos. 19 to 30 ... .....dis 45 @ 5- %
Stone, Tinned, Tinned list.....dis 45 @ 47½ 0
Tinned Broom Wire.....dis 57½ @ 60 %
Cast Steel Wire.....dis 47½ @ 50 %
Annealed Fence, Nos. 8 & 9.....dis 57½ @ 60
Annealed Grape, Nos. 10 to 14.....dis 57½ @ 60 %
Fence Staples.....₩ ℔ 5¾ @ 6½c
Fence Staples, Galvanized.....₩ ℔ 6¾ @ 6½c
Stubs Steel Wire.....$5.00 to £ dis 30 %
Japanned Barb Fence.....₩ ℔ 6½c
Galvanized Barb Fence.....₩ ℔ 7¼c
Steel Music Wire, Nos. 7 to 30.....$1.0 ₩ ℔
Picture Wire, T. S. & J.....dis 40 %
Clothes Line Wire, Galvanized.....₩ coil 25 @ 40c net
Wire Cloth, green, drab and black, ₩ sq. ft., 2c. 6@ 2½c.....net

**Wrenches.**
American Adjustable.....dis 45 %
Baxter's Adjustable "S," list Jan., 1880.....dis 20&5 %
Baxter's Diagonal.....dis 20&5 %
Coes' Genuine.....dis 50&3 %
Coes "Mechanics".....dis 50&10&3 %
Coes' Pattern, Malleable.....dis 75 %
Coes' Pattern Wrought .....dis 65@70 %
Girard Standard.....dis 60 %
Girard Agt.....dis 70 %
Bemis & Call's Patent Combination.....dis 20 %
Bemis & Call's Merrick's Pattern.....dis 35 %
Bemis & Call's Brigg's Pattern.....dis 25 %
Bemis & Call's Cylinder or Gas Pipe.....dis 40 %
Van Wagoner & Williams' Basin.....₩ doz $4.50
Aiken Pocket (Bright).....$5.00, dis 50&10 %
The Favorite Pocket (Bright).....₩ doz $4, dis 30 %
Webster's Patent Combination.....dis 25 %
Taylor's Farmers'.....dis 25 %

**Wringers.**

| | Per doz. |
|---|---|
| Universal, XX, No. 2½ | 42.00 |
| Universal, XX, No. 2 | 45.00 |
| Universal, XX, No. 1½ | 51.00 |
| Universal, XX, No. 1 | 66.00 |
| Peerless, no Cogs, No. 1 | 42.00 |
| Peerless, with Cogs, No. 2½ | 45.00 |
| Peerless, with Cogs, No. 2 | 48.00 |
| Peerless, with Cogs, No. 3 | 54.00 |
| Peerless, with Cogs, No. 4 | 66.00 |
| Eureka, No. 2 | 42.00 |
| Novelty No. 2, for Common Tubs | $42.00 |
| Novelty No. 3, for Common Tubs | 48 00 |
| Excelsior No. E, for Stationary Tubs | $51.00 |
| Excelsior No. F, for Stationary Tubs | 57.00 |
| Excelsior No. A, with Folding Bench | 60.00 |
| Excelsior No. B with Folding Bench | 66.00 |

Lots of 1 doz., dis 5%; lots of 5 doz., dis 10%.


# Henry Disston & Sons,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

Front and Laurel Streets,

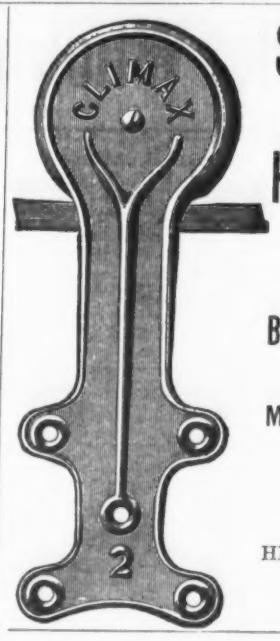
PHILADELPHIA.

Branch Works: TACONY. Branch House: CHICAGO.

# SAWS, FILES & TOOLS,

For the Markets of the World.

Back Saws,
Band Saws,
Butchers' Saws,
Cross-Cut Saws,
Combination Saws,
Compass Saws,
Concave Saws,
Circular Saws,
Drag Saws,
Gauge Saws,
Gang Saws,
Hack Saws,
Ice Saws,
Inserted Tooth Saws,
Japanese Saws,
Keyhole Saws,
Kitchen Saws,
Mulay Saws,
Mill Saws,
Movable Back Saws,
Miter-Box Saws,
Panel Saws,
Pit Saws,
One-Man Cross-Cut Saws,
Pruning Saws,
Pork Packers' Saws,
Right and Left Hand Saws,
Segment Saws,
Shingle Saws,
Skew-Back Saws,
Veneering Saws,
Webb & Fellows' Saws,
Whit Saws,
Wood Saws.




# S. H. & E. Y. MOORE,

163 and 165 Lake Street, CHICAGO,

HEAVY HARDWARE AND RAILWAY SUPPLIES.

MANUFACTURERS OF

"CLIMAX" Barn Door Hangers,

Baggage Car Door Hangers, Railroad Hangers,

MOORE'S HAND HOISTS,

MOORE'S DIFFERENTIAL PULLEY BLOCKS, &c.

SEND FOR PRICE LISTS.

EASTERN AGENCIES:

HENRY B. NEWHALL CO., 105 Chambers Street, NEW YORK.

HENRY B. NEWHALL CO., 47 Pearl Street, Boston, J. H. WORK, - Manager.

Established 1849.

# JOHN C. JEWETT & SONS,

BUFFALO, N. Y., U. S. A.,

MANUFACTURERS OF

# Bird Cages

FOR HOME AND EXPORT TRADE.

OUR BRASS AND JAPANNED

CAGES

IN DURABILITY AND FINISH FAR EXCEL ALL

OTHER MAKES.

Send for Illustrated Catalogue.

Also Exclusive Manufacture of the Revolving Perch Bird Cage.

THE GIANT HOLLOW HANDLE,

WITH TEN USEFUL TOOLS FOR MECHANICS' AND HOUSE-KEEPERS' USE.

This is a half-size illustration.

The Tools are made of the best Cast Steel, tempered in oil, and are superior to anything of the kind ever put on the market.

1 SCREW DRIVER,
1 CHISEL,
1 SCRATCH AWL,
1 GIMLET,
1 GOUGE,
4 BRAD AWLS,
1 TACK PULLER.

The Tools are 2¼ inches long and 3-16 inch sbank. The Handle is rosewood, 6 inches long, with patent swing top and cam fastening.

Price, $1.25 each, postage prepaid.

*For Sale generally by the Hardware Trade of the United States.*

C. E. JENNINGS & CO., 96 Chambers St., New York.

# THE ALFORD & BERKELE COMPANY,

GUNS, PISTOLS,

Cutlery, Plated Ware, &c.

Manufacturers' Agents.

BOTTOM FIGURES.

P. O. Box 2002.

No. 77 Chambers St., New York.

SPECIALTIES.—Goodell Co., Table Cutlery, Butcher, Bread, Shoe, Cigar, Putty and other Knives; Beaver Falls Cutlery Co., Pocket Cutlery; Holmes & Edwards Silver Co., Plated Knives, Forks, Spoons, &c.; "Sterling Line" Single and Double Action Revolvers; Unique Revolvers; Atwater Manufacturing Co., Ox Shoes and Carriage Hardware; New Haven Carpet Sweeper Co., Jumbo. Shelton, Yale and Rosedale Carpet Sweepers; Tinker & Hall Little Giant Rat Traps; Remington Guns, Rifles, Pistols and Ammunition; Patent Socket and Spiral Screw Drivers.

# RHODE ISLAND HORSE SHOE CO.,

MANUFACTURERS OF

Horse, Mule & Snow Shoes of the Perkins Pattern.

Works at Valley Falls, R. I. Office, 31 Exchange Place, Providence, R. I.

W. CARPENTER President. C. H. PERKINS, Gen'l Manager. R. W COMSTOCK Secretary

# ALEXANDER BROS BEST OAK BELTING

PHILADELPHIA.

# Elizabethport Steam Cordage Co.,

MANUFACTURERS OF MANILA, SISAL AND TARRED

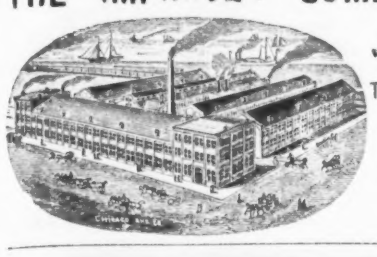
CORDAGE OF ALL KINDS.

BINDER TWINE A SPECIALTY.

E. M. FULTON, D. R. WHITLOCK, A. W. LUKENS.

46 South Street, New York.

## THE IMPROVED CUMMER AUTOMATIC ENGINE.



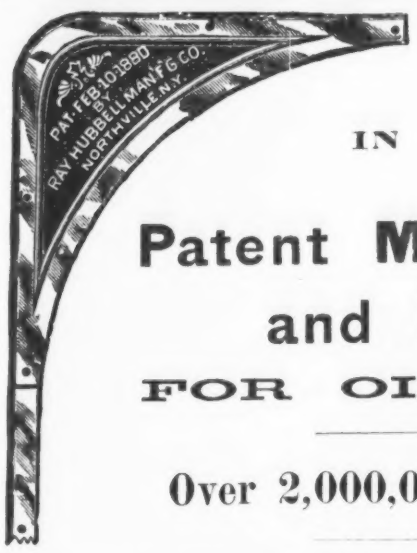
WE BUILD FIVE CLASSES OF ENGINES.

**No Steam-Engine Establishment in the U. S. is as well equipped as ours for doing first-class work.**

Send for Catalogue No. 9. Please mention this paper.

THE CUMMER ENGINE COMPANY, Cleveland O.

Hill, Clarke & Co. Boston, Mass., Eastern Agents.




## LARGEST MANUFACTURERS IN THE WORLD

—OF—

## Patent Metal Corners and Bindings FOR OIL CLOTH.

Over 2,000,000 Now in Use.

SAMPLE SET BY MAIL ON RECEIPT OF PRICE.

Brass Corners, No. 3 (4 to the Set), 6 yd. Binding and Tacks.....40 cents.
Tin " " " " " " " " .....25 "

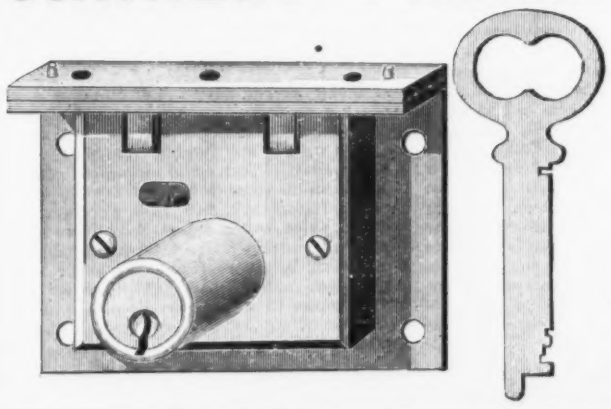
PRICE LIST AND CIRCULARS SENT ON APPLICATION.

## RAY HUBBELL,

Patentee and Sole Mfr. in U. S. and Canada,

NORTHVILLE, - - Fulton C., N. Y.

## THE CHARLES PARKER CO.,



MERIDEN, CONN.,

Manufacturers of

CABINET LOCKS.

THOMPSON McCOSH, President. JOHN A. McCOSH, Sec. and Treas.

Chica o Nos. 16 and 18 West Lake Street.

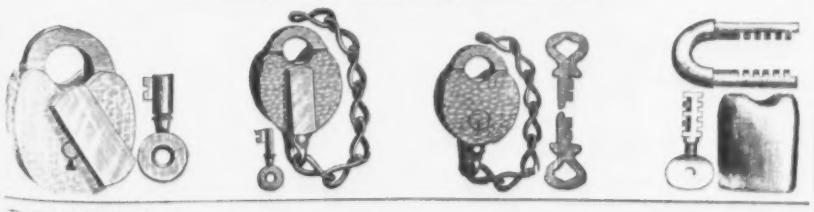
BRASS, MALL. IRON AND SCANDINAVIAN

## PADLOCKS,

Manufactured by JOHN J. TOWER, 96 Chambers St., New York.

BEST QUALITY. LARGE VARIETY.

Railroad and other Padlocks made to order.



Elevator Scales—all varieties. Erie Elevator, Dow's, Storr's and others. Send for estimates.

## RIEHLÉ BROS.

STANDARD

## SCALES AND TESTING MACHINES

PHILADELPHIA, 4th St., ab. Chestnut.
NEW YORK, 115 Liberty Street.
ST. LOUIS, 609 North Third St.
NEW ORLEANS, 142 Gravier Street

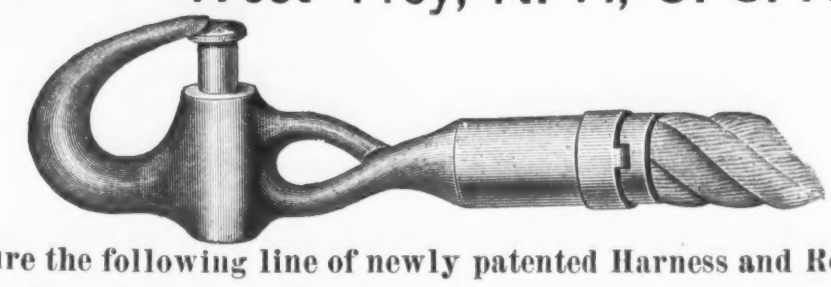
## THE HARTFORD HAMMER CO., Hartford, Conn.

Manufacturers of Solid Cast Steel Hammers, fully WARRANTED.

All Hammers stamped "HARTFORD" are See first issue of each month.

## THE UNION HARDWARE MFG. CO.,

West Troy, N. Y., U. S. A.,



Manufacture the following line of newly patented Harness and Rope Goods:

Loop, Round Eye, Open Eye, Double and Swivel "Union Snaps;" Improved German Snaps; Cattle and Horse Ties, in Hemp and Jute, with Rope Clamp, obviating Double Splice (see cut); Rope Buckle and Rope End Clamp; Leather Horse Ties; Hitching, Breast, Rein and Halter Chains, &c., &c.

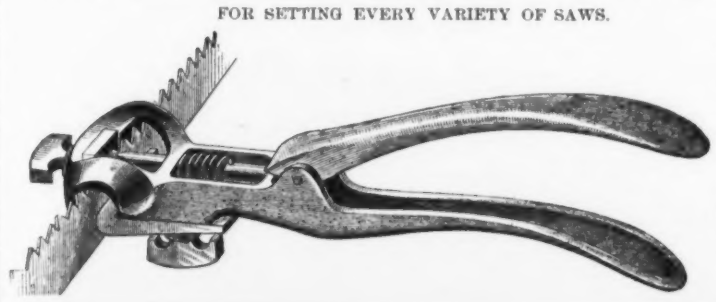
ILLUSTRATED CATALOGUE SENT FREE ON APPLICATION.

## HORACE F. SISE, Agent,

**100 Chambers Street,** **NEW YORK.**

## MORRILL'S PERFECT SAW SETS AND BENCH STOP.

FOR SETTING EVERY VARIETY OF SAWS.

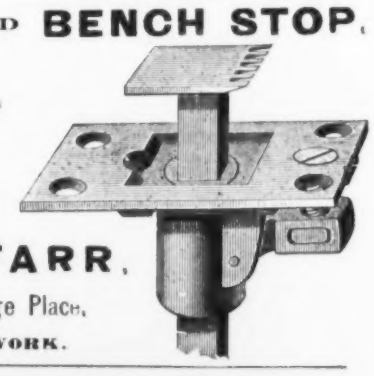


For price lists and discounts Address

ASA FARR,

64 College Place,

NEW YORK.



## JEFFERSON NAILS

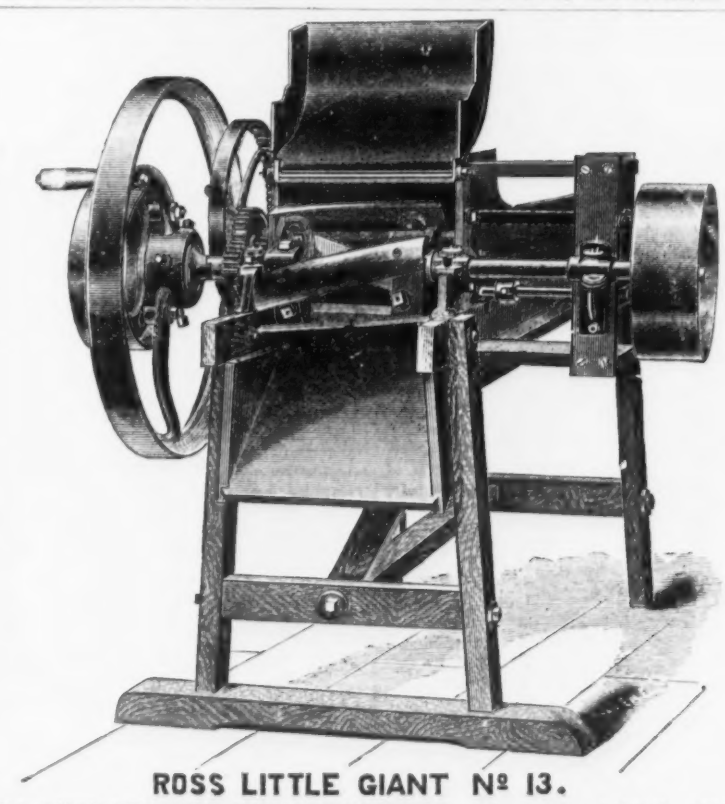
ALSO

## JEFFERSON PIG IRON.

Forge and Foundry, JEFFERSON IRON WORKS.

Office and Works, - - - - - - - - - STEUBENVILLE, OHIO.

W. H. WALLACE, President. C. B. DOTY, Vice-President. GEO. P. HARDEN, Secretary.



ROSS LITTLE GIANT No 13.

ROSS ENSILAGE AND FODDER CUTTERS, Giants and Little Giants.

THE VERY BEST CUTTERS IN THE MARKET.

GUARANTEED TO GIVE PERFECT SATISFACTION.

Our 1883 Cutters are the finest we have ever produced. A liberal discount to the trade. Write for prices and illustrated circular.

E. W. ROSS & CO., Fulton, Oswego Co., N. Y.

Mention *The Iron Age.*

## S. CHENEY & SON.

MANLIUS, N. Y.

MANUFACTURERS OF LIGHT AND MEDIUM WEIGHT

## GRAY IRON CASTINGS,

METAL PATTERN MAKERS AND JAPANNERS.

Correspondence solicited.

THE UNITED STATES IRON AND TIN PLATE COMPANY, LIMITED,

Demmler P. O., Allegheny Co., Pa.,

MANUFACTURERS OF THE

*U. S. A. M. and J. H. brands of Cold Rolled and Polished SHEET IRON AND SHEET STEEL.*

## RIVETS, BOILER, TANK AND BRIDGE.

STANDARD RIVET CO., Cleveland, Ohio

## VULCAN BOILER WORKS.

JAMES McNEIL & BRO.,

MANUFACTURERS OF

BOILERS, SHEET IRON, ROLLING MILL AND BLAST FURNACE WORK

Of all Kinds.

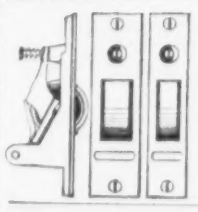
Vertical Boilers and Engines a Specialty. Repairing Done Promptly.

29th Street and A. V. R. R.,

PITTSBURGH

Specifications for Boilers furnished free of charge





HUGUNIN SASH BALANCE,

BRONZE FINISHED.

3 Sizes, made with 8 Improvements. Genuine Hugunin Balances have my name cast upon them as "Patentee and Sole Authorized Maker," and dates of patents on the boxes containing same. Beware of Imitations, and save trouble from infringement.

Robt. K. Hugunin, Hartford, Conn., U. S. A.

## Dynamite, Nitro Glycerine, BLASTING MATERIALS.

Contracts Taken for Clearing Lands of Stumps.

ADDRESS

THE HERCULES POWDER COMPANY

Cincinnati, Ohio.

GEO. M. EDDY & CO.,

Manufacturers of

Measuring Tapes

Of Cotton, Linen & Steel,

FOR ALL PURPOSES.

351 to 353 Classon Ave., Brooklyn N. Y.

### Gaseous Mines and Ventilating Appliances.

The instantaneous developement of gas appears to be an unfortunate privilege peculiar to many coal mines. It has been known to occur on several occasions and in large volume when there was no explainable reason for it. Enormous quantities of gas suddenly escape from the beds of coal, and science has hitherto been powerless to deal with the accidents resulting from occurrences of this kind. In view of this fact, it is but natural that strenuous efforts should have been made to afford the greatest possible amount of protection in the way of safety lamps and other appliances. Since Belgian coal-mining districts have been peculiarly unfortunate in suffering from accidents of this nature, a brief account of the methods employed may prove acceptable. The lamp now most generally used is the Mueseler lamp, the use of which has rapidly extended since 1844. On January 2, 1860, 14,597 lamps of this type were already in use in the province of Liège. They are now employed exclusively throughout the fiery mines of Belgium, where their price is from 5 to 6 francs apiece. The existence of fire-damp is mentioned for the first in the fifteenth century by the historian of Liège, Bartholomew Fisen. It appears that it was first found in the mines on the shores of the Meuse; and it is said to have appeared in a form resembling spiders' webs, which it was sought to disperse by agitating the air with sticks and with clothes. Efforts were soon made to get rid of the gas by renewing the air, and ventilating shafts were employed from 1696. Even when the mines were still of small depth, these were found to be necessary. A furnace was lighted at the bottom of the shaft, to augment the draft of air. The first ventilating machines were pressure pumps worked by windmills. Large bellows, similar to those of the blacksmith, were also employed. Steam came in subsequently to transform completely the principles of ventilation, by substituting the process of exhaustion for the process of pumping.

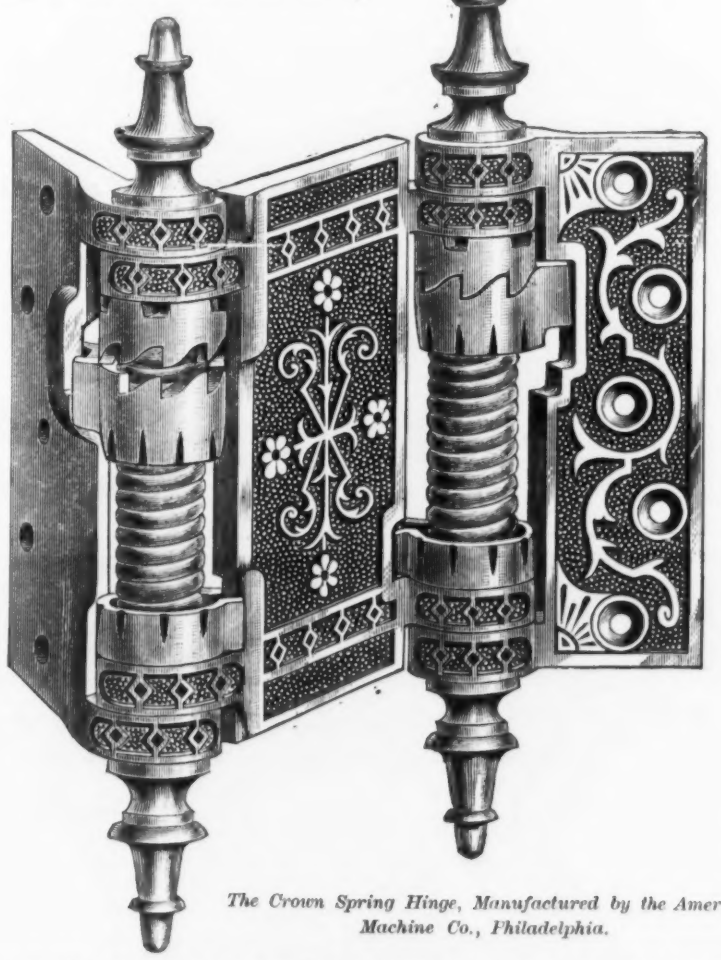
The first steam ventilators were piston pumps, which still exist at the Esperance shaft and at Seraing, where they were installed in 1835. A similar machine with air-vessels was installed at Marihaye in 1842, and has been often imitated since—among other places in the construction of the Mont Cenis and St. Gothard's tunnels. In 1845 M. Fabray invented his rotary pumps, which still remain in favor to a certain extent. A remarkable specimen can be seen at the Marihaye Colliery, one of the most fiery mines in the Liège basin. Shortly afterward M. Lemielle invented a fan founded on the same principle as the last named, viz., the formation of a vacuum within a space varying in size, into which the air from the mine passes and from which it is expelled outward by means of an impressed rotary motion. A fan on this system, and of colossal dimensions, can be seen at the Horloz Colliery. Lastly, M. Guibal invented his centrifugal fan, provided with an exterior casing and a chimney. This last system is at present mainly in fashion, not only in Belgium, but in all mining districts. It is not rare to see Guibal fans having a diameter of 12 meters (40 feet) running at 80 revolutions per minute, and discharging 50 cube meters (1760 cubic feet) of air per minute with a vacuum of 215 mm. (8½ inches) head of water. In England they have even been constructed of a diameter of 46 feet. This system has numerous good qualities, which give it the preference over others in all cases where the volume of air to be drawn, and especially the vacuum to be produced, does not necesitate dimensions which are altogether out of the question. Ventilators present great advantages over the furnaces still employed in many places in England. Independently of the permanent danger which the latter offer in fiery mines, they have the further inconvenience of consuming a vast amount of coal, and not having the same efficiency as fans for great depths. There is still to be mentioned the Harzé ventilator, in which the Guibal chimney has been replaced by a diffuser on the Rittinger system. These ventilators can be seen at the Lonette and other collieries. At the Marie shaft in the Seraing works a turbine ventilator was put up in 1878. This ventilator has a diffuser and guide-blades, and was constructed according to the theory of turbines from the designs of M. Kraft, chief engineer to the Société Cockerill. Lastly, in several collieries within the basin, the steam-jet ventilators of Körting Bros. have been erected for cases of emergency. These ventilators are based on the same principle as the Giffard injector.

So far as the earlier methods of illumination were concerned, it may be of interest to state that the original appliance consisted simply of a candle fixed to the miner's hat by a lump of clay. A particular workman called the "penitent" was charged with the duty of going every morning with a candle at the end of a long pole to kindle the fire-damp in recesses where it might have accumulated. Notwithstanding the numerous and disastrous accidents which demonstrated the dangers of fire-damp, the safety lamp, when first introduced, met with a good deal of opposition, and its adoption was for a long time prevented by the force of custom.

**Glass Works Starting Up**—Advices from Pittsburgh, under date of August 20, are to the effect that after a suspension since July 1 work was resumed on that date in all the flint-glass factories of that vicinity. This is an evidence that a satisfactory arrangement concerning wages has been made, and that for another year there will be no trouble in this branch of the trade. The hollow-ware and window-glass factories are still idle, however, and the indications are that a protracted lockout will be inaugurated in these trades next month, instead of a resumption of work. Both sides are trying to keep everything to themselves, but it is known that the manufacturers insist on a heavy reduction in wages, and that the workmen refuse to accept any reduction. The window-glass manufacturers have determined to postpone their start-up until September 17, and as they generally make hollow-ware they will expect to start both at the same time. The chimney-glass blowers held a meeting, Aug. 19, and to the number of 178 cut loose from the Knights of Labor. Representatives of the gatherers were present and pledged themselves to a similar course. The chimneymen working in Pittsburgh proper seceded from the Knights of Labor six months ago. The pressers also seceded from the Knights of Labor. The reason assigned for the withdrawal is that the Knights of Labor have been of no use to the glassworkers. In a strike of 22 months, beginning in 1877, the 900 pressers and chimneymen received only $400 from the organization. Three months before the strike the American Flint Glass Association was formed, with 18 assemblies, and in that time the strikers received $18,000. Now there are 42 assemblies in the United States and Canada.

### Crown Spring Hinges.

The American Machine Co., corner Lehigh avenue and American street, Philadelphia, Penn., are manufacturing a line of spring hinges known as the "Crown" spring hinge, under C. B. Clark's patent of April 4, 1882. Our engraving shows a double-acting spring hinge, adapted for solid doors, embodying the principles employed in all the styles they manufacture. The features of the hinge are so clearly shown in the illustration that a lengthy description is not necessary. The spring is of the spiral kind, and tension is obtained by an adjustable ratchet shown in place in the hinge at the right, and shown dropped in the hinge at the left, thus illustrating the method of tightening it. The directions for putting on tension are as follows. Turn the upper ratchet with a nail to the right until the desired tension is obtained; then push the lower ratchet up into its place, as shown in the engraving. The pressure of the spring holds it securely and keeps it from falling. Tension is released by turning the upper ratchet slightly to the right, when the lower ratchet will fall down and the spring will uncoil upon removing the nail from the ratchet. In putting these hinges upon the market the manufacturers call attention to their simplicity of construction, the small liability to get out of order, and the facility with which the tension of the spring is managed. Another advantage cited is the fact that there are no loose pieces about the hinge to be lost or mislaid. They are manufactured in various grades, from very light surface spring hinges, adapted for screen doors, to double-acting hinges of the general kind shown in our engravings, adapted for solid doors. They are finished in black japan with nickel-plated steel springs; also in bronze and in full nickel, as required for different purposes.



*The Crown Spring Hinge, Manufactured by the American Machine Co., Philadelphia.*

**An Important Sale.**—The Marquette *Mining Journal* announces the recent sale of the Cleveland Iron Company's docks, real estate, &c, in Marquette, with all the rights and privileges, to the Detroit, Mackinac and Marquette Railroad Company. This transaction, says the *Journal*, considering the value of the property and the significance attaching to it in connection with other movements of the railroad company, is the most important we have had occasion to record for years. The results to the city of which it gives promise are also of far-reaching importance. It gives assurance that the Detroit, Mackinac and Marquette management has at least discovered that it must abandon the idea of making a leading ore shipping port of St. Ignace, and equip itself thoroughly for doing a shipping business at Marquette, if it would secure and retain any considerable share of the ore-carrying trade of the district. To place itself in a position to compete with rival lines on equal terms for a portion of this traffic two things were necessary. It was essential that the line should be extended to the mines above here; also that dockage facilities for rapid and economical handling of the ore should be supplied at this point. By the contemplated extension of its line to Negaunee and Ishpeming the first condition will be met, as the second has been by the purchase announced, and we may expect that road to do its share another year toward giving Marquette the rank to which she is entitled as an ore-shipping port. The Marquette, Houghton and Ontonagon Railroad has done much for our city—all that one road could do, probably, to promote its prosperity and help along its growth. But the time has come when two roads from Marquette to the mines west of us are essential to the further progress of the place and the accommodation that shippers must have at this point. That we are to have these is no longer open to doubt, the purchase which is the text of this screed leaving no possible hook for skepticism to hang a suspicion upon of the Detroit, Mackinac and Marquette Company's sincerity in respect to the extension of its line to the mines.

## TRADE PUBLICATIONS.

### Well Machinery.

We are in receipt of the catalogue and price list for 1883–84 of the American Well Works, located at Aurora, Ill. The business of this company is the construction of railroad, city and farm wells, water works and the manufacture of well machinery, windmills and supplies. The first illustrated matter in the pamphlet is a description and explanation of Chapman's hydraulic well machinery. This apparatus drills and pumps a hole into the ground and brings the chips, drillings, dirt or sand out of the hole to the surface without removing the tools. The machinery is operated by means of a horse-power which is moved by one or more horses, according to the kind of work being done. The apparatus is designed for use by special contractors who make a business of putting down drilled or bored wells. Several engravings are given showing the use of the apparatus for different purposes, and an imaginary ground section is shown of a hydraulic reservoir tube well made by the drilling process employed by this company. Numerous testimonials are given indicating the satisfaction of the parties whose names are signed with the work they have inspected. Following is a list of Chapman's earth augers, succeeding which are expansion drills, and then follows a general list of tools useful in work of the kind indicated and for repairs. In the latter part of the pamphlet are cuts and prices of pumps adapted for various purposes, horse-powers, valves and fittings, steam-drilling apparatus, and a chapter on windmills. An examination of this book cannot fail to be of advantage to all those who have anything to do with providing water supply for country dwellings, towns, or railroad watering stations.

### Tub, Pail and Chair Machinery.

Messrs. Goodspeed & Wyman, of Winchendon, Mass., send us their catalogue for 1883 of tub, pail, chair and other wood-working machinery. Among the machines represented is a new and improved Woodworth planer, Stimpson's improved dowel-joint machine, cylinder stave saws, tub and pail stave saws, pail lathe, improved rotary matcher, head lathe and stave planer. Among the miscellaneous wood-working machines shown are saw and boring machines, small saw bench, back-knife gauge lathe, improved gauge lathe, rod pin and doweling machine, warp-spool lathe and upright boring machine.

### Fairbanks Testing Machines.

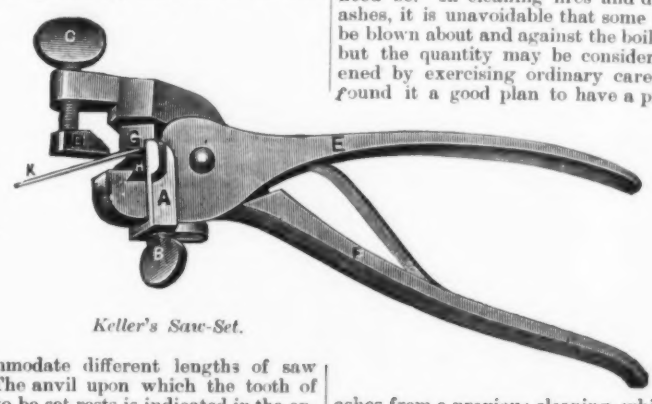
Fairbanks & Co., 311 Broadway, have just got out an additional descriptive circular of their testing machines. These machines range from the smallest cement testers, intended to stand on a table, up to a 150,000-pound machine of the largest size and capable of testing full-sized material of all kinds. The circular also contains information in regard to the testing department of the company at 84 Thomas street, New York, under the charge of A. B. Abbott, C. E., where they do testing of almost every conceivable description. They have a machine now almost completed that is capable of giving a stress of 400,000 pounds, either in compression or in tension.

### Worthington Pumping Engines, Steam Pumps and Hydraulic Machinery.

This is the title of the catalogue recently issued by the Henry R. Worthington Hydraulic Works, of 86 Liberty street and 145 Broadway, New York. The catalogue is elegantly illustrated, not only by perspective engravings, but also by sectional views and diagrams of the more important parts and features of the different styles of pumps. In addition to the standard forms, we notice a very large number of special pumps, both vertical and horizontal, intended for a great variety of unusual situations. In addition to the ordinary pumps, water-works engines, power pumps, pressure pumps, water meters and pump fittings are also illustrated and prices quoted.

### Keller's Saw-Set.

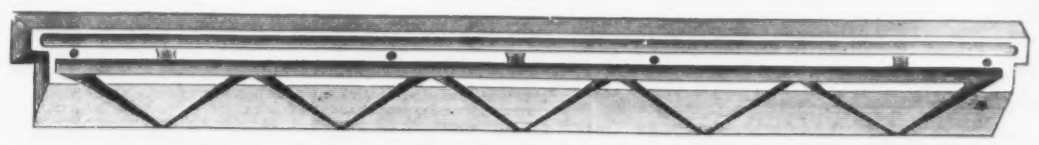
In the cut we show what is known as Keller's saw-set, which, having been manufactured for a number of years in Albany, N. Y., has achieved a good local reputation. It has recently passed into the hands of Messrs. Charles Croissant & Bro., of that place, and is now being pushed and offered to the trade generally. The engraving is a very fair representation of the device, and will be understood by the following epitome of the directions for using which are sent out with it: The set is placed on the saw, as shown in the engraving, K representing the saw blade. A is a tooth gauge, which is readily adjusted in place by the set-screw B. It moves longitudinally along the jaw E, so as to accommodate different lengths of saw teeth. The anvil upon which the tooth of the saw to be set rests is indicated in the engraving by H, while G is the set-piece and is triangular in shape. If by any accident one angle of this set-piece is injured, it can be instantly removed and another substituted, and, in turn, after those at one end have all been spoiled, it can be reversed, thus presenting three fresh corners. Each side of the gauge A is provided with a face, against which the points of the adjacent teeth are intended to touch while a tooth is being set. By means of the set-screw C, the stop D which is attached to it can be made to permit a greater or less set to the saw, according to the relative adjustment of the face of the stop B with the face of the anvil H. The set is operated by compressing the handles in the usual manner.



*Keller's Saw-Set.*

### Combined Door and Weather Strip.

Herewith we present an engraving of a door and weather strip that is being offered by the Howard Mfg. Co., 52 Dearborn street, Chicago, Ill. This weather strip, which is intended to take the place of the ordinary threshold of an outside door, is of metal. The peculiar features incorporated in it, and which are intended to prevent beating under the door from storms, the use of garden hose and the like, are a set of channels, clearly shown in the engraving. The channel shown nearest the top in the engraving comes inside the door, the door itself coming directly over the line in which the screw holes are shown for fastening in position. The outside channel has grooves leading outward from it toward the front of the strip. Between the inner and outer channels three communicating notches are cut, which are intended to let any water that may be carried under the door, and which falls into the inside channel, flow out into the outside channel. Inasmuch as the notches do not come opposite the diagonal grooves leading from the outer channel, the wind is not liable to force the water back through them. We understand from the manufacturers that a very large number of these strips are in use, and that they have given satisfaction. These strips are handsomely finished in various styles, including bronze and japan.



*Wood's Combined Door and Weather Strip, Made by the Howard Mfg. Co., Chicago.*

Eben Boynton, of Newark, N. J., has entered suit in the United States Circuit Court against Hussey, Howe & Co., steel manufacturers, of Pittsburgh, to recover $600,000 damages. The plaintiff alleges that on April 23, 1879, he entered into a contract with the defendants to purchase large quantities of steel from them, including some for the manufacture of hand saws at 8½ cents per pound and for circular saws at 14 cents per pound. Settlements were to be made every 30 days by note at six months, the defendants agreeing to discount these notes at 6 per cent., should the plaintiff desire to pay cash. In pursuance of this agreement he entered into contracts to supply saws, &c., to dealers all over the country, expending about $200,000 for plants and the carrying on of his business. He now complains that the defendants have failed to fulfill their part of the contract, and in consequence has suffered damages to the amount stated.

### Cast-Iron Boiler Fronts.

Cast-iron boiler fronts, says a correspondent of the *Locomotive*, as used upon externally-fired flush-front boilers, are generally unattractive in appearance, ill-fitting and desitute of all ornamention. We can understand why this should have been so 20 years ago, when the darkest and dirtiest hole about an establishment and which could not be used for any other purpose, was generally selected as the fittest place to put the boiler, but of late years there has been a change for the better, boilers being placed in well-lighted vaults in our cities, or in boiler-houses provided with a sufficient number of windows to afford ample light in other places where ground space is not so valuable, a change our boiler makers have failed to properly recognize by designing an attractive boiler front which would be a credit to themselves and in keeping with the boiler's improved surroundings. Cast-iron work can be so easily and cheaply ornamented that there is no excuse for the ordinary flat-faced fronts which disfigure nine-tenths of our boiler-rooms. Steam users would be benefited could a huge bonfire be made of the old-style patterns for boiler fronts, so we might start afresh with fronts of tasteful design, and adapted to the purposes of their use. The old front has long blocked the way of several modern reforms in boiler setting, chief among which is that of allowing a distance of from 20 to 30 inches between boiler bottom and grate, while that of the old construction rarely exceeded 14 inches, for which castings might be had at many of our boiler shops and iron foundries, while for the modern design, with a few notable exceptions, there was neither patterns nor castings.

Boiler fronts are often kept very dirty and untidy in appearance, much more so than need be. In cleaning fires and dampening ashes, it is unavoidable that some dust shall be blown about and against the boiler fronts, but the quantity may be considerably lessened by exercising ordinary care. I have found it a good plan to have a pile of wet ashes from a previous cleaning, which, when covered lightly over those just drawn, keeps down much of the usual cloud of dust which arises and envelops everything in the engine and boiler room, where hot clinkers and ashes are dampened with a hose. A pile of wet ashes is also a very handy thing to cover up a fire with in any sudden emergency, and is much safer, effective and more comfortable to use than an attempt to haul fires at such times. Lampblack and oil are commonly used to paint boiler fronts, which are kept presentable afterwards by frequent rubbing down with a piece of oily waste or rag. Asphaltum varnish is recommended for the same purpose, and has the advantage in appearance of giving a glossy coat or finish instead of the usual dead, lusterless hue.

**American Agricultural Machinery in India.**—Consul-General Mattson, of Calcutta, discussing the opening in India for American plows and fanning mills, suggests the advisability of manufacturers of these articles being represented at the exhibition to be opened in Calcutta, December 1. The farmers of India cultivate 200,000,000 acres of land, or about 75,000,000 acres more than the entire acreage devoted to grain of all kinds in the United States. The land is plowed from two to five times every year, with no better implement than an iron-pointed wooden stick, which does not turn over the soil, but only stirs and shakes it to the depth of 3 or 4 inches. The small American garden plow, which turns a furrow of 8 or 9 inches, and is so light that a 10-year old boy can carry it on his shoulder and a good-sized pony can work it in the field, is, in the judgment of the consul, the very plow to introduce into India, where, he says, an immense market awaits the successful manufacturer. A few changes in the model would, however, be necessary, and these are illustrated by suitable engravings in the consul's report. The immense quantity of cereals produced on this 200,000,000 acres of land is cleaned and separated for food and for the market by the same old system of hand winnowing which was in use among the Israelites of old; and hence the importance of a fanning mill made with especial reference to cleaning and separating grain for the European market. As the farmers individually raise comparatively small crops, these fanning mills should be small, light and cheap, to come within their means; and as time to them is not very valuable, the mill need not be made to do much work in a day, but rather do it well. All European samples of plows and mills so far introduced have proved too heavy and expensive.

Henderson Brothers, agents of the Anchor Line, have received a cable dispatch announcing that the steamer City of Rome was sighted off Fastnet at 9 o'clock Saturday morning. She left this port at 7.20 a. m. on August 18. Her time to Fastnet, according to Henderson Brothers, was 6 days, 20 hours and 45 minutes. This is one of the quickest passages on record.

# The Iron Age Directory

## And Index to Advertisements.


**Agricultural Implements.** PAGE
Grant Fan Mill and Cradle Co., Melrose, N. Y. 9

**Air Compressors.**
Clayton Steam Pump Works, Brooklyn, N. Y. 46
The Norwalk Iron Works Co., S. Norwalk Conn. 46

**Alarm Money Drawers.**
Oneida Alarm Till Co., East Syracuse, N. Y. 10
Tucker Alarm Till Co. 10

**Anti-Friction Metals.**
Reeves Paul S., Philadelphia 50

**Anvils.** *Manufacturers of.*
Boker Hermann & Co., 101 and 103 Duane, N. Y. 29
Fisher & Norris, Trenton, N. J. 9

**Apple Parers.**
Sayre L. A., 28 Orange st., Newark, N. J. 20

**Arms and Ammunition.**
The Alford & Berkele Co., 77 Chambers, N. Y. 32
Field Alfred & Co., 93 Chambers, N. Y. 10
Remington E. & Sons, 283 Broadway, N. Y. 12
Schoverling, Daly & Gales, 84-86 Chambers, N. Y. 20
Smith, Otis A., Rockfall, Conn. 39
Stevens J. & Co., Chicopee Falls, Mass. 12

**Artesian Well Supplies.**
Lovejoy & Drake, 101 Reade, N. Y. 27

**Asbestos.**
The Asbestos Packing Co., Boston, Mass. 38

**Atomizers.**
Rowland, Thos. F., Brooklyn, N. Y. 11

**Axles, Springs, &c.** *Manufacturers of.*
Concord Axle Co., Fisherville (Concord), N. H. 37
Cook R. & Sons, Winsted, Conn. 13
Gautier Steel Dpt. of Cambria Iron Co, Johnstown, Pa. 38&40
Wurster F. W., Brooklyn N. Y. 46

**Barb Wire Machinery.**
Stover Mfg. Co., Freeport, Ill. 16

**Band Saws.**—Sniggs & Co., Buffalo, N. Y. 44

**Band Saw Filing Machine.**
Goodell & Waters, Philadelphia, Pa. 27

**Bankers.**
P. W. Gallaudet & Co., 2 Wall, N. Y. 27

**Barb Wire and Fence.**
Hawk Eye Steel Barb Fence Co., Burlington, Iowa. 33
Haish J. & Co., DeKalb, Ill. 47
Iowa Barb Wire Co., 87 Liberty, N. Y. 2
Middleton C. W. & H. W., Philadelphia, Pa. 9
Washburn & Moen Mfg. Co., Worcester, Mass. 2

**Bellows,** *Manufacturers of.*
Flaccus Wm. & Son, Pittsburgh, Pa. 9
Scott Geo. M. Chicago, Ill. 39

**Bells (Sleigh.)**
Bevin Bros. Mfg. Co., Easthampton, Conn. 40

**Belt Hooks.**
Browning, Sisum & Co., 84 Chambers, N. Y. 2

**Belting,** *Makers of.*
Alexander Bros., 412 N. 3d, Philadelphia 32
N. Y. Belting and Packing Co., 29 Park Row, N. Y. 13
Whelpley R. H., Chicago, Ill. 29

**Belt Protectors.**
Lewis Edward S., Albany, N. Y. 29

**Bicycles.**
Pope Mfg. Co., 597 Washington, Boston 48

**Bird Cages.** *Makers of.*
Gunther G., 16 Park Place, N. Y. 3
Jewett John C. & Sons, Buffalo, N. Y. 32
Pierce Geo. N. & Co., Buffalo, N. Y. 39
Lindeman O. & Co., 243 Pearl, N. Y. 3
Maxwell John, 247 and 249 Pearl, N. Y. 7

**Blasting Materials.**
Hercules Powder Co., Cincinnati O. 33

**Blocks, Tackle.** *Makers of.*
Bagnall & Loud, Boston, Mass. 45
McCoy & Sanders, 26 Warren, N. Y. 42
McMillan Wm. H. & Bro., 113 South, N. Y. 48
Michigan Block Works, Detroit, Mich. 48
Penfield Block Co., Lockport, N. Y. 16

**Boiler Feeders.**
The Miller Co., Canton, O. 39

**Boilers, How to Keep Clean.**
Hotchkiss J. F., 84 John, N. Y. 12

**Boilers, Steam.**
Edge Moor Iron Company, 79 Liberty, N. Y. 17
Harrison Boiler Works, Philadelphia, Pa. 47
Lowe & Watson, Bridgeport, Conn. 41
McNeil, James & Bro., Pittsburgh, Pa. 34

**Bolt and Rivet Clippers.**
Chambers, Brother & Co., Philadelphia, Pa. 40

**Bolt and Screw Cases.**
Am. Bolt and Screw Case Co., Dayton, O. 42

**Bolt Cutters.**
Howard Iron Works, Buffalo, N. Y. 11
National Machinery Co., Tiffin, O. 10
Novelty Iron Works, Cleveland, Ohio 17
Sellers Wm. & Co., Phila., and 79 Liberty st., N. Y. 47
Wiley & Russell Mfg. Co., Greenfield, Mass. 28

**Bolts.**—American Bolt Co., Lowell, Mass. 44
Wm. H. Haskell Co., Pawtucket, R. I. 48
Lovejoy & Drake, 101 Reade, N. Y. 27
Moore, S. H. & E. Y., Chicago 32
Pawtucket Mfg. Co., Pawtucket, R. I. 37

**Boring Machines.**
W. R. Wells Mfg. Co., Ashaway, R. I. 42

**Boxes for Hardware.**
Green S. H., 12 Murray, N. Y. 29

**Brass,** *Manufacturers of.*
Ansonia Brass and Copper Co., 19 Cliff, N. Y. 2&29
Bridgeport Brass Co., Bridgeport Conn. 2
Brown & Bros., 81 Chambers, N. Y. 2
Davol John & Sons, 100 John, N. Y. 2
Detroit Copper and Brass Rolling Mills, Detroit, Mich. 2
Holmes, Booth & Haydens, 49 Chambers, N. Y. 2
Plume & Atwood Mfg. Co., 18 Murray, N. Y. 2
Rome Iron Works, Rome, N. Y. 2
Scovill Mfg. Co., 421 Broome, N. Y. 2
Waterbury Brass Co., 306 Broadway, N. Y. 2
Waterbury Mfg. Co., Waterbury, Conn. 3

**Brass Butt Hinges.**
Tiebout W. & J. 16 and 18 Chambers, N. Y. 37

**Brass Founders.**
McFarland Wm., Trenton, N. J. 47
Reeves Paul S., Philadelphia 46
Reynolds Martin, Brooklyn, E. D., N. Y. 46

**Bridge Builders.**
Moseley Iron Bridge and Roof Co., 5 Dey, N. Y. 4

**Buckets, Pump and Elevator.**
Rowland T. F., Brooklyn, N. Y. 48

**Builders' Hardware.**
Clark Mfg. Co., Buffalo, N. Y. 37
Fayson Mfg. Co., Chicago, Ill. 10
Multiple Mfg. Co., Cleveland, O. 13

**Butcher and Shoe Knives.** *Manufacturers of.*
Wilson John, Sheffield, England 10

**Butts and Hinges.**
Stanley Works, New Britain, Conn. 37
Union Mfg. Co., 96 Chambers, N. Y. 7

**Car Axles.**
Roberts A. & P. & Co., 205 S. 4th, Philadelphia. 5

**Carriage Bolts.** *Makers of.*
Townsend, Wilson & Hubbard, Philadelphia. 45

**Carriage Hardware.** *Makers of.*
Liggett Spring and Axle Co., Pittsburgh, Pa. 8
Smith R. D. & Co., Plantsville, Conn. 12

**Carts** —C. Spring Cart Co., Rushville, Ind. 44

**Casters.**—Phœnix Caster Co., Indianapolis, Ind. 10
Yale Caster Co., New Haven, Conn. 43

**Castings, Brass and Iron.**
Whipple Mfg. Co. 13

**Castings, Iron.**
Bowler & Co., Cleveland, Ohio. 6
S. Cheney & Son, Manlius, N. Y. 33
Devlin Thos. & Co., Philadelphia, Pa. 7
Haight & Clark, Albany N. Y. 42
Hammer & Co., Branford, Conn. 10
North Brothers, Philadelphia, Pa. 27
Sharon Valley Mal. and Gray Iron Co., Sharon Valley, Conn. 46
Syracuse Malleable Iron Works, Syracuse, N. Y. 4
Youngstown Malleable Iron Co., Youngstown, O. 7

**Castings, Steel.**
Chester Steel Castings Co., 407 Library, Phila., Pa 48
Eureka Cast Steel Co., Chester, Pa. 48
Flagg Stanley G. & Co., Philadelphia. 48
Johnson J. G. & Co., Spuyten Duyvil, N. Y. 6
Mackintosh, Hemphill & Co., Pittsburgh, Pa. 6
Pittsburgh Steel Casting Co., Pittsburgh, Pa. 48

**Chains,** *Manufacturers of*
Bradlee & Co., 815 Richmond St., Phila., Pa. 5

**Chemical Analyses.**
Haines R., Philadelphia 5

**Chemicals**
Eimer & Amend, 205 Third Ave., N. Y. 41

**Chisels,** *Manufacturers of.*
Buck Bros., Millbury Mass. 13

**Civil Engineer and Geologist.**
Randolph B. S., Martinsburg, W. Va. 20

**Clay Pigeons and Traps.**
The Clay Pigeon Co., Cincinnati, O. 29

**Clock Springs, &c.**
Dunbar Bros., Bristol, Conn. 7

**Clothes Dryers.**
Hill Dryer Co., Worcester, Mass. 16

**Coal,** *Miners of.*
Pardee A. & Co., 111 Broadway, N. Y. 40

**Coal Hods.**
Esterbrook Wm., Philadelphia, Pa. 17

**Coal Vases.**
Jewett John C. & Sons, Buffalo, N. Y. 32

**Coat and Hat Hooks.**
Van Wagoner & Williams, 82 Beekman, N. Y. 48

**Coffee and Spice Mills.**
Lane Brothers, Poughkeepsie, N. Y. 38
Enterprise Mfg. Co., Philadelphia, Pa. 37

**Coke.**—Schoonmaker, J. M., Pittsburgh, Pa. 38

**Commission Agents.**
Mustard & Co., Shanghai, China 10

**Compasses and Calipers.** *Manufacturers of.*
Bemis & Call Hdw. & Tool Co., Springfield, Mass. 33 & 37
Stevens J. & Co., Chicopee Falls, Mass. 12

**Copper.**—Brown & Bros., 81 Chambers, N. Y. 2
New Haven Copper Co., 299 Pearl, N. Y. 2
Pope, Cole & Co., Baltimore, Md. 3
Pope Thos. J. & Bro., 292 Pearl, N. Y. 4

**Cordage.**
Elizabethport Steam Cordage Co., 48 South, N. Y. 32

**Corn Huskers.**
Graham & Haines, 113 Chambers, N. Y. 8

**Corrugated Iron.**
Merchant & Co., Philadelphia, Pa. 42
Moseley Iron Bridge and Roof Co., 5 Dey, N. Y. 4

**Coverings, Boiler and Pipe.**
Chalmers Spence Co., 23 John St., N. Y. 17

**Cranes.**
Yale & Towne Mfg. Co., Stamford, Conn. 11

**Crucibles.**
Seidel R. B., Philadelphia, Pa 43

**Cupolas.**
Smith & Sayre Mfg. Co., 245 Broadway, N. Y. 47

**Cutlery,** *Importers of.*
Boker Hermann & Co., 101 Duane, N. Y. 29
Clatworthy F. & W., 82 Chambers, N. Y. 10

**Cutlery,** *Manufacturers of.*
Bannister A. ". & Co., Newark, N. J. 10
John Russell Cutlery Co., Turners Falls, Mass. 48
Vought & Williams, 288 Greenwich, N. Y. 4

**Dog Collars.**
Medford Fancy Goods Co., 96 Duane, N. Y. 9
Pope & Stevens, 114 Chambers, N. Y. 39

**Dinner Pail and Lantern.**
Haight Joseph, Port Chester, N. Y. 8

**Door Hangers, House and Barn.**
Lovejoy & Drake, 101 Reade N. Y. 27
Moore S. H. & E. Y., Chicago, Ill. 32
Stearns E. C. & Co., Syracuse, N. Y. 48
Terry Mfg. Co., Dundee, N. Y. 16

**Drilling Machines.** *Makers of.*
Clark, Sintz & Co., Springfield, O. 48
Dallett Thos. H. & Co., Philadelphia, Pa 46
E. L. Harrington, Philadelphia, Pa. 47
Peerless Punch & Shear Co., 115 Liberty N.Y. 47
Wiley & Russell Mfg. Co., Greenfield, Mass. 28

**Drop Forgings.**
The Billings & Spencer Co., Hartford, Conn. 38
Brown R. H. & Co., Westville, Conn. 46
Chicago Forging Co., Chicago, Ill. 12
Merrill Bros., 26 First st., Brooklyn, E. D. 29

**Drop Hammers.**
Williams, White & Co., Moline, Ill. 37

**Eaves Trough Hanger.**
Heartley Geo. W., Toledo, O. 29

**Edge Tools,** *Makers of.*
Doscher M., 84 Chambers, N. Y. 45

**Electrotyping and Engraving.**
Dean Chas. W., Cleveland, O. 42

**Elevators.** *Makers of.*
Clem & Morse, Philadelphia Pa. 47
Crane Bros. Mfg. Co., Chicago, Ill. 44&49
Stokes & Parrish, Philadelphia. 40
Tewksbury Automatic Elevator Co., Newark, N. J 12

**Emery.**
Walpole Emery Mills, South Walpole, Mass. 36

**Emery and Corundum Wheels.**
Vitrified Wheel Co., Westfield, Mass 41

**Emery Wheels.**
Union Stone Co., Boston, Mass. 39

**Engines, Disk.**
Colts Pat. Fire Arms Co., Hartford, Conn 12

**Engines, Fire.**
La France Fire Engine Co., Elmira, N. Y. 45

**Engines, Gas.**
Schleicher, Schumm & Co., Philadelphia. 47

**Engines, Locomotive.**
Baldwin Locomotive Works, Philadelphia, Pa. 6

**Engines, Steam.** *Makers of.*
Ball Engine Co., Erie, Pa. 16
Cooke & Co., 12 Cortlandt, N. Y. 9
Cox & Sons, Philadelphia, Pa. 47
Dunbar, R. & Son, Buffalo, N. Y. 46
Ervien Chas. W. & Co., Philadelphia, Pa. 47
Noteman Rotary Engine & Pump Co., Toledo, O. 45
Rumsey L. Mfg. Co., St. Louis, Mo. 44
Southwark Foundry & Machine Co., Philadelphia. 17
The Cumner Engine Co., Cleveland, O 33
The Norwalk Iron Works Co., S. Norwalk, Conn. 46
The Pusey & Jones Co., Wilmington, Del. 16
Wetherill Robt. & Co., Chester, Pa. 47

**Engravers, Wood.**
Stillman & Co., Cincinnati, O. 12

**Facings, Foundry.**
Am. Facing Co., 517 W. 15th, N. Y. 38
Emerick, J. A. & Co., Philadelphia, Pa. 3
Obermayer S. & Co., Cincinnati, O. 29
Paxson J. W. & Co., 514 Beech, Phila. 6

**Faucets,** *Makers of.*
McNab & Harlin Mfg. Co., 30 Gold, N. Y. 45

**Faucets,** *Self-Measuring, Makers of.*
Enterprise Mfg. Co., of Pa., Phila. and N. Y. 37
Lane Bros., Poughkeepsie, N. Y. 38

**Feed Cutters.**
Ross E. W. & Co., Fulton, N. Y. 33

**Fences, Wrought Iron.**
E. T. Barnum Wire and Iron Works, Detroit, Mich 37
National Wire and Iron Co., Detroit, Mich. 29

**Files,** *Importers of.*
Field Alfred & Co. 93 Chambers, N. Y. 10
Carr J. & Riley 30 Gold, N. Y. 40
Montgomery & Co., 105 Fulton, N. Y. 46
Moss F. W., 80 John, N. Y. 40

**Files,** *Manufacturers of.*
Auburn File Works, 89 Chambers, N. Y. 8
Barnett G. & H., 41 and 43 Richmond, Phila. 8
Detroit File Works, Detroit, Mich. 8
Everhart James M., Scranton, Pa. 48
Henssler Christian, Philadelphia, Pa. 8
Hiscox File Mfg. Co., West Chelmsford, Mass. 8
Johnson & Bro., 1 Commercial, Newark, N. J. 8
McCaffrey & Bro., 1712 and 1714 N. 4th, Phila. 8
Nicholson File Co., Providence, R. I. 8
Paul Chas. B., Williamsburgh N. Y. 8
Spencer, Mathias & Sons, Sheffield, England. 12
Union File Works, Baltimore, Md. 8

**Fire Brick.** *Makers of.*
Borgner & O'Brien, Philadelphia, Pa. 38
Climax Fire Brick Co., Pittsburgh, Pa. 38
Colson Chas. D., Chicago, Ill. 38
Evens & Howard, St. Louis, Mo. 6
Gardner Brothers, Pittsburgh, Pa. 38
A. Hall Terra Cotta Co., Perth Amboy, N. J. 48
Hall & Sons, Buffalo, N. Y. 38
Kreiscner B. & Sons, foot of E. Houston, N. Y. 38
Maurer Henry, 418 East 2nd, N. Y. 38
Newton & Co., Albany, N. Y. 38
Ostrander James & Son, Troy, N. Y. 46
Perth Amboy Terra Cotta Co., 80 and 81 Astor House, New York. 38
Rimington S. A., 40 and 42 Broadway, N. Y. 38
Union Mining Co., Philadelphia, Pa. 38
Valentine M. D. & Bro., Woodbridge, N. J. 38
Watson Fire Brick Co., Perth Amboy, N. J. 38
Woodland Fire Brick Co., Woodland, Pa. 38

**Fittings, Malleable and Gray Iron.**
Star Machine Works, Cleveland, O. 20

**Flue Cleaners.**
Cleveland Flue Cleaner Mfg. Co., Cleveland, O. 42

**Forges, Portable, &c.**
Buffalo Forge Co., Buffalo, N. Y. 16
Holt Mfg. Co., Cleveland, O. 45
Keystone Portable Forge Co., 218 Carter, Phila. 16

**Forgings, Iron and Steel.**
Pittsburgh Tool Co., Pittsburgh, Pa. 4

**Foundry Supplies.**
Am. Facing Co., 517 W. 15th, N. Y. 38
Emerick J. A. & Co., Philadelphia, Pa. 3

**Furnace Hoists.**
Stokes & Parrish, Phila., Pa. 46

**Furnaces,** *Makers of.*
Richmond & Potts, 119 S. 4th, Phila., Pa. 5

**Grain Scoops.**
Hussey, Binns & Co., Pittsburgh, Pa 39

**Grate Bars.**
Etna Grate Bar Co., 110 Liberty, N. Y. 41
Creswell David S., Philadelphia, Pa. 47

**Grindstones.**
McDermott & Berea Stone Co., Cleveland, O. 37
Ohio Grindstone Co., Cleveland, O. 37
Wood Walter R., 281 and 283 Front N. Y. 37
Worthington & Sons, Cleveland, O 37

**Gunpowder,** *Makers of.*
Laflin & Rand Powder Co. 29 Murray, N. Y. 44

**Guns, Pistols, &c.**
Kittredge B. & Co., Cincinnati, O. 10

**Hammers.**
Hartford Hammer Co., Hartford, Conn. 33

**Hammers, Steam.**
Bradley & Co., Syracuse, N. Y. 48

**Hand Force Pumps.**
Union Mfg. Co., 96 Chambers, N. Y. 7

**Handles (Hammer).**
Musselman & Son, Quakertown, Pa. 7

**Handles, Tool**
Jennings C. E. & Co., 96 Chambers, N. Y. 32

**Handles and Spokes.**
Hundley V. G., 79 Reade, N. Y. 42

**Hardware Commission Merchants.**
Field Alfred & Co., 93 Chambers, N. Y. 10
Lovejoy & Drake, 101 Reade, N. Y. 27

**Hardware Dealers.**
Lloyd, Supplee & Walton, 625 Market, Phila. 27

**Hardware Importers.**
Boker Hermann & Co., 101 Duane, N. Y. 29
Field Alfred & Co., 93 Chambers, N. Y. 10

**Hardware Manufacturers.**
Enterprise Mfg. Co., Phila. 37
Lloyd, Supplee & Walton, 625 Market, Phila., Pa. 27
Miller's Falls Co., 74 Chambers, N. Y. 27
Reading Hardware Co., Reading, Pa. 9
Stanley Works, New Britain, Conn. 37
Trenton Lock & Hardware Co., Trenton, N. J. 16
Union Mfg. Co., 99 Chambers, N. Y. 7
Whipple Mfg. Co., Cleveland, O. 13

**Hardware Specialties.**
Hotchkiss G. M. & Co., West Haven, Conn. 3
Kyser & Rex, Philadelphia, Pa. 27
Moore S. H. & E. Y., Chicago 32
Spencer & Underhill, 94 Chambers N. Y. 10

**Harness Snaps.**
Covert Mfg. Co., West Troy, N. Y. 37
Union Hdw. Mfg. Co., West Troy, N. Y. 35

**Hay Knives.**
Hiram Holt & Co., East Wilton, Me. 45

**Heater and Purifier, Feed Water.**
Lowe & Watson, Bridgeport, Conn. 41

**Hinges.**
Stanley Works, New Britain, Conn. 37
Union Mfg. Co., 96 Chambers, N. Y. 7

**Hoes.**—Bruce George W., 1 Platt, N. Y. 9

**Hog Ringers.**—Blair E. Eucyrus, O 42
Chambers, Bering & Quinlan, Decatur, Ill. 16
H. W. Hill & Co., Decatur, Ill. 36

**Hoisting Engines,** *Makers of.*
Crane Bros., Mfg. Co., Chicago, Ill. 44&46
Frisbie D. & Co., Philadelphia, Pa. 47
Rumsey L. M. & Co., St. Louis, Mo. 44

**Hoisting Machines.**
Box Alfred & Co., 312 Green, Phila. 38
Clem & Morse, Philadelphia, Pa. 47
Moore S. H. & E. Y., Chicago. 32
Sellers Wm. & Co., Phila. and 79 Liberty st., N. Y. 47
Stokes & Parrish, Phila., Pa. 46

**Hoists, Portable.**
Dunn J. Cleveland, Ohio. 45

**Hooks (Cotton & Bale.)**
New York Handle & Mallet Works, 456 E. Houston. 13

**Horse Hay Forks.**
Waldron & Sprout, Muncy, Pa. 13

**Horse Nails.** *Makers of.*
Essex Horse Nail Co., Troy, N. Y. 6
Livingston Horse Nail Co., 104 Reade, N. Y. 37
National Horse Nail Co., Vergennes, Vt. 27
New Haven Horse Nail Co., 103 Chambers, N. Y. 12

**Horse Rasps and Files.**
Heller & Bro., Newark, N. J. 8

**Horse Shoes.** *Makers of.*
Rhode Island Horse Shoe Co., Providence, R. I. 32
Schoenberger & Co., Pittsburgh, Pa. 4
The Burden Iron Co., Troy, N. Y. 4

**Hot Blast Stoves.**
Witherow & Gordon, Pittsburgh, Pa. 36

**Hydrants, &c.**
McLean John, 300 Monroe, N. Y. 38
Eddy Valve Co., Waterford, N. Y. 45

**Hydraulic Jacks.**
Dudgeon Richard, 24 Columbia, N. Y. 9
Watson & Stillman, 470B Grand, N. Y. 47

**Ice Cream Freezers.**
Roebuck S. & Co., 161 Fulton, N. Y. 42
White Mountain Freezer Co., Nashua, N. H. 39

**Ice Tools.**
Heartley Geo. W., Toledo, O. 29

**Injectors.**
Desmond Injector Co., Jackson, Mich. 36
Jenks James, Detroit, Mich. 44
Flammang Injector Co., Cleveland, O. 36

**Inspirators.**
Fairbanks & Co., 311 Broadway, New York. 46

**Insurance, Boiler.**
Hartford Steam Boiler Inspection & Insurance Co. 38

**Iron.** (*Manufacturers' Agents.*)
Cox, Jr., Justice & Co., 333 Walnut, Phila. 5
Froment Frank L. 112 John st., N. Y. 4
Hoffman J. W. & Co., 208 S. 4th, Phila. 4
Levis Henry & Co., Philadelphia, Pa. 5
Lundell Chas. G. (Swedish), Boston, Mass. 6

**Iron.** *Manufacturers of.*
Albany & Rensselaer Iron & Steel Co., Troy, N. Y. 40
Britton Iron and Steel Co., Cleveland, O. 6
Burden Iron Company, Troy, N. Y. 4
Calumet Iron & Steel Co., Chicago, Ill. 6
Keystone Rolling Mill, Limited, Pittsburgh, Pa. 4
Kirkpatrick & Co., Pittsburgh Pa 4
Leavitt, C. W., 161 Broadway, N. Y. 4
Leonard John, 420 West St., N. Y. 4
Montour Iron & Steel Co., Danville, Pa. 40
Phœnix Iron Co., 410 Walnut, Philadelphia 5
Roane Iron Co., Chattanooga, Tenn. 6
Rome Merchant Iron Mills, Rome, N. Y. 4
Rowland James & Co., 920 N. Delaware ave., Phila. 5
Rowland Wm. & Harvey, Philadelphia 48
Shoenberger & Co., Pittsburgh, Pa. 4
The Passaic Rolling Mill Co., Paterson, N. J. 4
Ulster Iron Works, 90 Broadway, N. Y. 4
Wood Alan & Co., Arch, Philadelphia. 5

**Iron Brokers.**
Blakey & Walbaum, Philadelphia, Pa. 5
Boynton Geo. A., 70 Wall, N. Y. 44
Etting Edward J., Philadelphia, Pa. 5
Fox & Drummond, 68 Wall, N. Y. 4
Smith E. D., Philadelphia, Pa. 5
Watts Ethelbert, Philadelphia, Pa. 5

**Iron, Charcoal.** *Warm or Cold Blast.*
Hernsheim L. (Austrian), 20 Nassau, N. Y. 6
Lundell Chas. G. (Swedish), Boston, Mass. 6
Quincy John W. & Co., 98 William, N. Y. 4

**Iron Commission Merchants.**
Heberton & Co., Philadelphia. 5
Hernsheim L., 20 Nassau, N. Y. 6
Lea J. Tatnall & Co., Philadelphia. 5
Lundberg Gustaf, Boston, Mass. 41
Lundell Chas. G., Boston Mass. 6
Mohr J. J., 430 Walnut, Philadelphia 5
Wister L. & R. & Co., Philadelphia, Pa. 5

**Iron Dealers.**
Abeel Brothers, 190 South, N. Y. 4
Abbott Jere & Co., New York and Boston 41
Bonnell, Botsford & Co., Youngstown, O. 4
Borden & Lovell, 70 and 71 West, N. Y. 4
Carmichael & Emmens, 130 and 132 Cedar N. Y. 4
Cooney Daniel F., 88 Washington, N. Y. 4
Cox Justice, Jr., & Co., Philadelphia, Pa. 5
Egleston Bros & Co., 160 South, N. Y. 4
Gill Mathew, Jr., & Co., Philadelphia, Pa. 5
Harrison & Gillson, 452 to 462 Water, N. Y. 4
Heathfield, Eyre & Co., London, England 5
Hoffman J. W. & Co., 208 S. Fourth, Philadelphia. 5
Hubbard Chas., 46 Cliff, N. Y. 4
Judson B. F., 457 and 459 Water, N. Y. 4
Keeley Jerome & Co., Philadelphia, Pa. 5
Lovejoy & Drake, 101 Reade, N. Y. 27
Lloyd & Lindsay, Philadelphia. 5
Lundberg Gustaf, 38 Kilby, Boston, Mass. 41
Lundell Chas. G. (Swedish), Boston, Mass. 6
Middleton W. S., 52 John, N. Y. 4
Naylor & Co., 99 John, N. Y. 40
Ogden & Wallace, 85, 87, 89 and 91 Elm, N. Y. 4
Pierson & Co., 24 Broadway, N. Y. 4
Pullman J. Wesley, Philadelphia, Pa. 5
Quincy John W & Co., 98 William, N. Y. 4
Wallace Wm. H. & Co., Albany and Washington streets, N. Y. 4
Wilson E. H. & Co., Philadelphia, Pa. 5
Whitney A. R. & Co., 48 Hudson, N. Y. 4

**Iron Fences.**
Champion Iron Fence Co., Kenton, O. 38

**Iron Founders.**
Bannan Fras. B., Pottsville, Pa. 6

**Iron, Pig,** *Importers of.*
Abbott Jere & Co. (Swedish), New York & Boston. 41
Hubbard, Chas., 46 Cliff, N. Y. 4
Lee James & Co., 72 Pine, N. Y. 4
Lundberg Gustaf, Boston, Mass. 41
Lundell, Chas. G. (Swedish), Boston, Mass. 6
Richardson, J. O., Philadelphia. 5
Ross, James W., Chicago, Ill. 4
Wessels Ed. J., 17 Cedar, N. Y. 4
Williamson James & Co., 69 Wall N. Y. 4

**Iron, Sheet.** *Manufacturers of.*
Jersey City Galvanizing Co., Jersey City, N. J. 4
Lefferts, Marshall & Co., 90 Beekman, N. Y. 4
Wood W. D. & Co. Pittsburgh, Pa. 4

**Iron, Steel and Nails.**
Morris, Wheeler & Co., 14 Cliff, N. Y. 5

**Jack Screws.**
Illinois Iron and Bolt Co., Carpentersville, Ill. 16

**Labels.**
Hunscom P. L. & Co., Chicago, Ill. 38

**Lanterns.** *Manufacturers of.*
Buckeye Lantern Co., Bellaire, O. 36
Dietz R. E., 54 and 56 Fulton, N. Y. 48
Howard & Morse, 45 Fulton, N. Y. 2

**Lathes, Pulley Blocks, Drills.**
Harrington E. & Son, Philadelphia, Pa. 47

**Lawn Mowers.**
Chadborne & Coldwell Mfg. Co., Newburg, N. Y. 36

**Lemon Squeezers.**
Ripley Mfg. Co., Unionville, Conn. 8

**Levels.**
Comstock Wm. T., 6 Astor Place, N. Y. 10

**Locks and Knobs.**—*Manufacturers of.*
Durrie & McCarty, 97 Chambers, N. Y. 27
Hilleibrand & Wolf, 110 S. 8th, Philadelphia. 44
Quackenbush J. E. & Son, 535 8th av., N. Y. 39
Romer & Co., Newark, N. J. 12
Smith & Egge Mfg. Co., Bridgeport, Conn. 39
Taylor Mfg. Co., New Britain, Conn. 44
Trenton Lock and Hardware Co., Trenton, N. J. 16
The Charles Parker Co., Meriden, Conn. 33
Whipple Mfg. Co., Cleveland, O. 13

**Lubricator Cups.**
Detroit Lubricator Co., Detroit, Mich. 6

**Machinery.**
Adt John, New Haven, Conn. 42
Barnes W. F. & John, Rockford, Ill. 17
Bliss, E. W., 107 Plymouth, Brooklyn 46
Dodge, Heller & Lyons, Newark, N. J. 41
Garvin E. E. & Co. 130 Centre, N. Y. 46
Peerless Punch and Shear Co., 38 W. Dey, N. Y. 47
Pittsburgh Mfg. Co., Pittsburgh, Pa. 45
Purdy Machine Co., Cleveland, O. 46
Sellers Wm. & Co., Phila., and 79 Liberty, N. Y. 47
Smith H. B. Mach. Co., Philadelphia, Pa. 40
Stokes & Parrish Phila., Pa. 46
Stow Flexible Shaft Co., Limited, Philadelphia. 47
The Stiles & Parker Press Co., Middletown, Conn. 48
Wetherill Robert & Co., Chester, Pa. 47

**Machinists' Tools and Supplies.**
Blaisdell P. & Co., Worcester, Mass. 45
Eynon W. R. & Sons, Cleveland, O. 17
L. B. Flanders Machine Works, Philadelphia. 36
Johnson I. H., Jr., & Co., Philadelphia, Pa. 47
King J. M. & Co., Waterford, N. Y. 6
Rhode Island Tool Co., Providence, R. I. 20
Sellers Wm. & Co., Phila., and 79 Liberty, N. Y. 47

**Mallets.**
N. Y. Handle and Mallet Works, 456 E. Houston. 13
Penfield Block Co., Lockport, N. Y. 16

**Metal Corners.**
Ray Hubbell Mfg. Co., Northville, N. Y. 33

**Measuring Tapes.**
Eddy Geo. M. & Co., 353 Classon Ave., Brooklyn, N. Y. 33

**Metals.**
Detroit Copper & Brass Rolling Mills, Detroit, Mich. 2
Dickerson, Van Dusen & Co., 29 and 31 Cliff, N. Y. 2
Gill Matthew, Jr., & Co., Philadelphia, Pa. 5
Naylor & Co., 99 John, N. Y. 40
Northrop A. C., Waterbury, Conn. 2
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Phosphor Bronze Smelting Co., Limited, 512 Arch, Philadelphia. 13
Purves A. & Son, cor. South and Penn, Phila. 5

**Metallurgists.**
Booth, Garrett & Blair, 919 Cnant, Philadelphia. 5
Britton J. Biodgett, 330 Walnut, Philadelphia. 20

**Mills.**—Newell's, 10 Barclay, N. Y. 29

**Mills, Bone Grinding.**
Wilson Bros., Easton, Pa. 36

**Milling Machines.**
Hilles & Jones, Wilmington, Del. 47

**Mine Lamps.**—Leonard Bros., Scranton, Pa. 3

**Mineral Wool.**
U. S. Mineral Wool Co., 22 Cortlandt, N. Y. 27

**Miners' Candles,** *Makers of.*
James Boyd's Sons, 10 and 12 Franklin, N. Y. 12

**Molding Machines.**
Drummond Mfg. Co., Louisville, Ky. 42

**Molding Sand.**
Emerick J. A. & Co., 1056 Beach, Philadelphia, Pa. 3
Paxson J. W. & Co., 514 Beach, Philadelphia, Pa. 6
Schenectady Molding Sand Co., Schenectady, N. Y. 7
Whitehead Bros., 515 and 517 W. 15th, N. Y. 38

**Mouse Traps.**
Ripley Mfg. Co., Unionville, Conn. 8
Smith & Egge Mfg. Co. Bridgeport Conn. 39

**Nails.**—E. & G. Brooke Iron Co., Birdsbaw, Pa. 7
Cumberland Nail and Iron Co., Philadelphia, Pa. 6
Fuller Bros. & Co., 139 Greenwich, N. Y. 4
Jefferson Iron Works, Steubenville, O. 33
Oxford Iron Co., 81 Washington, N. Y. 4
Rowland Jas. & Co., 920 N. Delaware ave., Phila. 5
Schoenberger & Co., Pittsburgh, Pa. 4

**Nails, Cut.**—Blankenship, R. E., Richmond, Va. 7
Ross W. K., 97 Chambers, N. Y. 4

**Nail Machinery.**
Pittsburgh Mfg. Co., Pittsburgh, Pa. 45

**Nickel Platers' Supplies.**
Hanson, Van Winkle & Co., 92 Liberty, N. Y. 39
The Zucker & Levett Chemical Co., 540 to 544 West 10th, N. Y. 30

**Norway Shapes,** *Rollers of.*
Naylor & Co., 99 John, N. Y. 40
Rowland Wm. & Harvey, Frankford, Philadelphia. 48

**Nuts, Bolts, etc.,** *Makers of.*
Allentown Rolling Mill Co., Allentown, Pa. 5
Henry B. Newhall Co., 105 Chambers, N. Y. 44
Lovejoy & Drake, 101 Reade, N. Y. 27
Russell, Burdsall & Ward, Port Chester, N. Y. 48
Standard Nut Co., Pittsburgh, Pa. 45

**Oil Stones.**
Chase Geo., 107th and Harlem River, N. Y. 37

**Ores.**—Jackson Iron Co., Cleveland, O. 6

**Ox Shoes.**
Millers Falls Co., 74 Chambers, N. Y. 27

**Packing.**
Jenkins Bros., 71 John, N. Y. 36

**Padlocks.**
Fairbanks & Co., 311 Broadway, N. Y. 16
Tower John J., 96 Chambers, N. Y. 33

**Paint.**
Billings, Taylor & Co., Cleveland, O. 44
Cleveland Iron Ore Paint Co., Cleveland, O. 41

**Parers, Peach and Apple.**
Scott Mfg. Co., Baltimore, Md. 12

**Patent Solicitors.**
Howson & Son, Phila., and Washington, D. C. 42
Stocking E. B., Washington, D. C. 44

**Pens, Steel.**
Esterbrook Steel Pen Co., 26 John, N. Y. 9

**Perforated Sheet Metals.**
Harrington & King Perforating Co., Chicago, Ill. 8

**Phosphor Bronze.**
Phosphor Bronze Smelting Co., Limited, 512 Arch Philadelphia. 13

**Picks.** *Makers of.*
Pierson & Co., 24 Broadway, N. Y. 4

**Pig Iron.**
Bond, Parsons & Co., 101 John, New York. 40
Jefferson Iron Works, Steubenville, O. 33
Quincey J. W. & Co., 98 William, N. Y. 4
Shenandoah Iron, Lumber, Mining and Mfg. Co., Philadelphia, Pa. 5

**Pig Iron Breaker.**
Blake Crusher Co., New Haven, Conn. 27&45

**Pipe Cutters.**
Pancoast & Maule, 243 & 245 23d st., Philadelphia. 37

**Pipe Threading and Cutting Machine.**
Cox & Sons, Philadelphia, Pa. 47

**Pipes, Fittings, etc.,** *Makers of.*
McNab & Harlin Mfg. Co., 56 John, N. Y. 45

**Pipe, Water and Gas.** *Makers of.*
McNeal A. H., Burlington, N. J. 6
Mellert Foundry and Machine Co., Limited, Reading, Pa. 16
Reading Iron Works, Philadelphia, Pa. 6
Wood R. D. & Co., 400 Chestnut, Philadelphia. 42
Wyckoff A., Elmira, N. Y. 13

**Plane Irons.** *Manufacturers of.*
Buck Bros., Millbury, Mass. 13

**Planes,** *Manufacturers of.*
Stan

## BOOKS ON IRON STEEL AND METALLURGY.

*Barba.—The Use of Steel.* By J. Barba; translated from the French by A. L. Holley; illustrated, 110 pages, 12mo, cloth; 1875 . $1.50

Treats of the composition and classification of steel for constructive purposes, with methods of working, applying and testing plates and bars.

*Byrne.—The Practical Metal Worker's Assistant.* By Oliver Byrne; revised edition, 609 illustrations, 683 pages, 8vo, cloth; 1872 . . $7

A comprehensive and complete work of instruction for metal workers, comprising metallurgic chemistry and the process of working iron, steel and all metals and alloys. Special attention is given to the best methods of forging, hardening and tempering, casting and founding, soldering, &c. The processes dependent upon ductility are explained, and there are chapters upon screw-cutting and other tools. The latter part of the book consists of the history and application of the art of electro-metallurgy to manufacturing purposes, including descriptions of galvanic batteries, and the processes of electrotyping and electroplating. There is also an appendix upon the manufacture of Russian sheet iron, Malleable iron castings and improvements in Bessemer steel.

*Bauerman.—Metallurgy of Iron.* By H. Bauerman; 5th edition, revised and enlarged, 58 illustrations, 515 pages, 12mo, cloth . . . $2

This work treats of the physical properties of iron ores, and the most approved means of reducing them to the purposes of the manufacturer. The methods of assay and analyses of iron ores are practically considered, as also their composition and distribution. The subject of blast furnaces, their capacity and production, has also received careful attention. In the present edition the author has added to the chapter on Steel Making, and has explained and illustrated the progress recently made in the process of steel manufacture, both of Siemens and Bessemer, especially the latter, by the adoption of lime as a dephosphorizing agent. The book also contains a chapter on the mechanical properties and tests of Malleable Iron and Steel. The author has succeeded in his avowed attempt to supply much practical and reliable information for ironworkers and others, in condensed form.

*Directory to the Iron and Steel Works of the United States.* Prepared by the American Iron and Steel Association, corrected to July, 184 pages, 8vo, cloth; 1882 . $3

This work is just what its title indicates. It embraces the blast furnaces, rolling mills, steel works, forges and bloomaries in every State and Territory. The names of establishments are given first, followed by the names of owners and their post-office addresses.

*Gore.—The Art of Electro-Metallurgy.* By G. Gore; illustrated, 391 pp., 12mo, cloth; 1877 . $2.50

Platers and gilders will find in this work a concise statement of the history and principles of electro-deposition, the general rules to be followed in actual working with all metals, and the special means of depositing nearly every known metal and metalloid.

*Graham.—Brass Founders' Manual.* By Walter Graham; numerous illus., 141 pages, 12mo, cloth. London: (Weale's series). . $0 80

This little volume contains instructions for modeling, pattern making, molding, alloying, turning, filing, burnishing and bronzing. Copious recipes and tables are presented, together with notes on prime costs and estimates. Although designed for English practice, it contains many suggestions valuable to brass founders in this country.

*Gruner.—The Manufacture of Steel.* By M. L. Gruner; 9 plates, 196 pages, 8vo, cloth; 1872 . . $3.50

In this translation from the French, the author critically considers the nature of steel, the methods of fining pig iron, and describes the theory and manufacture of steel by cementation and the Bessemer process in all the countries of Europe. There is also an appendix by the translator, Lenox Smith, on the Bessemer process in the United States.

*Kirk.—Founding of Metals.* By Edward Kirk; 4th edition, 21 illustrations, 272 pages, 8vo, cloth; 1881 . . . . . $2.50.

These notes contain the observations and experience of the 10 years' practice of a practical foundryman and chemist. Omitting chemical and technical terms, the author treats upon the forming of alloys and presents a general description of all the metals, minerals and gases used in the art of founding.

*Overman.—The Manufacture of Steel.* By F. Overman, M. E.; new, enlarged and revised edition, by A. A. Fesquet; 285 pages, 12mo, cloth; 1873 . . . . . $1.50

Blacksmiths and manufacturers of articles of hardware will find in this book a concise account of the nature and varieties of steel, and the practice and principles of working and making steel after the approved German and English methods.

*Urquhart.—Electro-Plating.* By J. W. Urquhart; with numerous illustrations, 216 pages, 12mo, cloth. London, 1882 . . . . . $2

Any ordinarily intelligent person may become skilled in the practice of electrotyping by consulting this practical handbook, which gives, in simple language, working direction for copper, silver, nickel and gold plates, with clear explanations of terms and tools adapted to the work.

*Larkin.—The Practical Brass and Iron Founder's Guide.* By James Larkin; 5th edition, revised, 301 pages, 12mo, cloth; 1866 . $2.25

A concise treatise on brass founding and molding by a practical founder. The properties of metals and their alloys are discussed with special reference to their use in bell and gun founding, and in casting and manufacturing statuary, medallions and various other articles used in the industrial arts and for ornamentation. Useful recipes for tinning, japanning and varnishing brass, iron and other metals are given, and there are brief remarks on the manufacture of iron and steel

*Urbin—Brull.—A Practical Guide for Puddling Iron and Steel.* By E. Urbin and A. Brull; 83 pages, 8vo, cloth; 1868 . . $1

This work, translated from the French by A. A. Fesquet, dwells fully upon the chemical reactions taking place during puddling, and contains hints upon the relative proportions of the fireplace, bed, flues, &c., to which is added a comparison of the resisting properties of iron and steel.

*Spretson.—Casting and Founding.* By R. E. Spretson; 2d edition, with 82 plates drawn to scale, 412 pages, 8vo, cloth. London 1880 . . . . . $

The object of this work has been to collect in one volume every subject on which a founder will require information. It embraces a full discussion of modern English and Continental practice in casting, founding, molding and case-hardening iron, steel, brass, bronze and other materials a founder may have to deal with. The illustrations show working drawings of cupolas, furnaces, blowing engines and all the machinery necessary to the art. The methods of founding statues, bells and articles used for art work and ornamentation are practically described

*Watt.—Electro-Metallurgy.* By Alexander Watt; new edition, enlarged, 195 pages, 12mo, cloth; 1882 . . . . . $1

A practical work on the electro-deposition of copper, silver, gold, brass, bronze, iron and nickel, with details and processes carefully described. The present edition contains much new matter upon the deposition of nickel.

Sent postpaid, on receipt of price, by

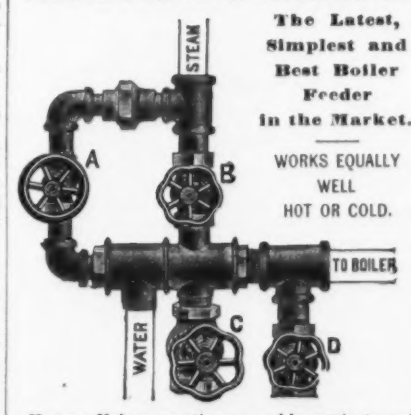
**DAVID WILLIAMS,**

Publisher and Bookseller,

**83 Reade St., NEW YORK.**

---

## THE DESMOND INJECTOR




**The Latest, Simplest and Best Boiler Feeder in the Market.**

WORKS EQUALLY WELL HOT OR COLD.

Has no Valves or other movable parts to get out of order. It can be entirely separated with a common monkey wrench. Is Easily Cleaned. It can be Operated by any Ordinary Engineer. Send for Descriptive Circular.

MANUFACTURED BY

**THE DESMOND INJECTOR CO.,**

**JACKSON, MICH.**

---

**THE JENKINS STANDARD PACKING** is acknowledged by users as the *Best* in the world. Unlike all other Packings, the **Jenkins Standard Packing** can be made any thickness desired in a joint by placing two or as many thicknesses together as desired, and following up joint it vulcanizes in place and becomes a metal of itself (it is frequently called Jenkins Metal) and will last for years, as it does not rot or burn out Avoid all imitations, as a good article is always subject to cheap imitations. The **genuine** has stamped on every sheet, **"Jenkins Standard Packing,"** and is for sale by the Trade generally. Manufactured only by

**JENKINS BROS.,**

PROPRIETORS JENKINS PATENT VALVES, PACKING, &C

**71 JOHN ST., NEW YORK.**

---

**T. NEW'S**

Prepared

## ROOFING

**FOR STEEP OR FLAT ROOFS.**

Applied by ordinary workmen at one-third the cost of tin. Circulars and samples free.

**T. NEW, 39 John St., New York.**

BARRETT, ARNOLD & KIMBALL, Western Agts.

CHICAGO, ILL.

---

## John T. Lewis & Bros

**No. 231 South Front St.**

**PHILADELPHIA.**

TRADE MARK.

MANUFACTURERS OF

Pure White Lead, Red Lead, Litharge, Orange Mineral, Linseed Oil,

**AND PAINTERS' COLOR**

---

**JOHN JEWETT & SON**

Manufacturers of the well-known brand

**WHITE LEAD**

TRADE MARK

ALSO MANUFACTURERS OF

**LINSEED OIL.**

**181 Front Street, NEW YORK.**

---

**The Atlantic White Lead and Linseed Oil Co.,**

Manufacturers of

**White Lead (Atlantic), Red Lead, Litharge, Glass Makers' Litharge and Orange Mineral;**

**LINSEED OIL.**

Raw, Refined and Boiled.

**ROBERT COLGATE & CO.,**

*287 Pearl St., NEW YORK*

---

**SALEM LEAD COMPANY,**

CORRODERS AND MANUFACTURERS OF

**PURE WHITE LEAD.**

ALSO MANUFACTURERS OF

**Lead Pipe and Narrow Sheet Lead.**

F. A. BROWN, Treas. **SALEM, MASS.**

---

## EXCELSIOR AND CLIPPER LAWN MOWERS

GUARANTEED BEST & CHEAPEST

LARGE REDUCTION IN PRICE

HAND MOWERS 10 TO 20 IN.

HORSE MOWERS 25 TO 40 IN.

Send for Circular & Price-List.

**CHADBORN & COLDWELL MANUF'G CO.**

**NEWBURGH, N. Y.**

---

**A. F. PIKE MFG. CO.,**

**Pike Station, - - - New Hampshire.**

Manufacturers and Wholesale Dealers in

## Bluestone

For Scythes, Axes, Knives and Turpentine Hacks.

Factories at Pike Station, N. H., and Evansville & Westmore, Vt.

**Genuine Old Reliable,**
**Indian Pond** (Red End),
**Premium, Union,**
**White Mountain,**
**Letolle, Hacker,**
**Diamond Grit,**
**Magic, Gilt Edge,**
**The New Boss,**
**Lamoille, Ragg,**
**Willoughby Lake,**
**Green Mountain,**
**Black Diamond,**
**Mowing Machine,**
**German Pattern,**
**Chocolate, Ax Bits.**

Stones made, labeled and branded in any style desired. PRICE and QUALITY GUARANTEED. All the above brands are of clear, keen grit, and *will not glaze.*

---

THE CELEBRATED

## BUCKEYE LANTERNS.

**BEST IN THE MARKET.**

**Elegantly Made.**
**STRONG.**
HIGHLY POLISHED.
Hinged Tops and Bottoms.
Removable Globes.

Will Stand any Draft of Wind.

**Free from Smoke.**

Manufactured only by

**Buckeye Lantern Co.**

**Bellaire, Ohio.**

SEND FOR PRICES.

---

## FLAMMANG INJECTOR CO.,

MANUFACTURERS OF

**The only GRADED Injector on the Market, and Perfectly Reliable.**

Send for Catalogue to

**44 Atwater Block - . - CLEVELAND OHIO.**

---

**GARRY IRON ROOFING COMPANY**

Largest manufacturers of Iron Roofing in the world. Manufacturers of all kinds of

**IRON ROOFING**

Crimped and Corrugated Siding, Iron Tile or Shingle,

Fire-Proof Doors, Shutters, &c

**IRON ORE PAINT AND CEMENT.**

152-158 MERWIN STREET, CLEVELAND, O.

Send for Circular and Price List No. 9.

---

USE THE HIGH STANDARD

## PURE TURKISH EMERY,

MADE ONLY BY THE

## WALPOLE EMERY MILLS,

**South Walpole, Mass.**

---

## SUMMER SHOWERS.

**"When the sun don't shine."—*Ha—y.***

## THE WEATHER.

The Chief Signal Officer at Washington reports the following *Weather Probabilities:*

For the *South Atlantic States*, cloudy, **rainy** weather, southwest veering to colder northwest wind; stationary or higher pressure.

For the *West Gulf States*, fair weather, variable winds, shifting to warmer southerly; stationary or lower pressure.

For *Tennessee and the Ohio valley*, local **rains**, followed by clearing weather, winds mostly westerly; nearly stationary temperature and higher pressure.

For the *Upper Lake region*, partly cloudy weather, occasional **rain**, winds mostly westerly; stationary or lower temperature, higher pressure.

For the *Upper Mississippi and Missouri valleys*, partly cloudy weather, occasional **rain**, variable winds, mostly westerly; stationary or higher temperature and pressure.

For the *Lower Lake region*, partly cloudy weather, with local **rains**, winds mostly westerly; stationary or higher temperature and pressure.

## PIGGISH PROBABILITIES

are that your stock of **HILL'S HOG RINGERS, TONGS and TRIANGULAR HOG RINGS** is about exhausted, and you should soon mail us an order.

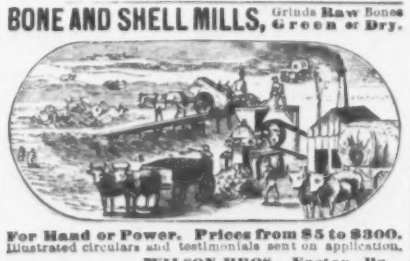
## H. W. HILL & CO.,

H. W. HILL.
C. P. HOUSUM.

Decatur, Ill

---

**BONE AND SHELL MILLS,** Grinds **Raw Bones Green or Dry.**



**For Hand or Power. Prices from $5 to $300.**

Illustrated circulars and testimonials sent on application.

**WILSON BROS., Easton, Pa.**

---

## WITHEROW & GORDON,

## Engineers & Contractors

**PITTSBURGH, PA.**

Agents for the

## WHITWELL HOT BLAST STOVES.

**OVER 600 IN USE.**

The following parties either have them in use or under construction.

Cedar Point Iron Co., N. Y
Dunbar Furnace Co., Pa.
Crane Iron Co., Pa.
Pennsylvania Steel Co., Pa.
Neshannock Iron Co., Pa.
R. H. Coleman, Lebanon, Pa.
Chester Rolling Mill Co., Pa.
Davenport, Fairbairn & Co., Pa.
Isabella Furnace Co., Pa.
Paxton Furnaces, Pa.
Spearman Iron Co., Pa.
Etna Iron Works, Ohio.
Milton Coal and Iron Co., Ohio
Winona Furnace Co., Ohio.
Moss & Marshall, Ohio.
H. Campbell & Sons, Ohio
Hocking Valley Iron Co., Ohio.
Cleveland Rolling Mill Co., Ohio.
Meier Iron Co., Ill.
North Chicago Steel Co., Ill.
Union Iron and Steel Co., Ill.
Means & Culbertson, Ky.
Ashland Furnace Co., Ky.
Norton Iron Co., Ky.
Southern States C., I. and S. Co., Tenn
Sewanee Furnace Co., Tenn.
James C. Warner, Rising Fawn, Ga.
Ohio Iron Co., Zanesville, O.
Stone Furnace Co., Ala.

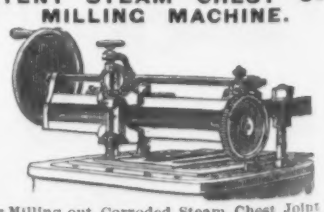
---

SEND FOR DISCOUNTS.

**R. C. PURVIS,**

**407 Cherry St., Philadelphia, Pa.**

**PATENT STEAM CHEST SEAT MILLING MACHINE.**



For Milling out Corroded Steam Chest Joint Surfaces for Strips; Facing off whole Surfaces and Milling out Ports. Easily Attached; Works Rapidly. Designed especially for Locomotives.

**L. R. FLANDERS' MACHINE WORKS,**

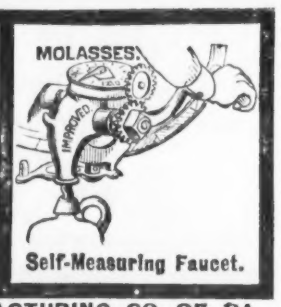
**PEDRICK & AYER, Proprietors.**

1025 Hamilton Street, - - - PHILADELPHIA.

New Descriptive Catalogue on Application.

Fruit, Wine & Jelly Press.

SAUSAGE STUFFER.



Self-Measuring Faucet.

Twenty different sizes from $2 to $100

Awarded First Premium Everywhere.

NO. 20 COFFEE MILL.

ENTERPRISE MANUFACTURING CO. OF PA.,
THIRD & DAUPHIN STS, PHILADELPHIA, PA.

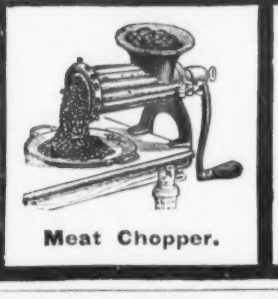
MRS. POTTS'
Cold Handle Double Pointed Sad Irons.

Tinctare Presses,
Self-Weighing
Cheese Knife,
Cork Presses.

THE BEST
ARE THE
CHEAPEST.

SOLD BY HARDWARE DEALERS.
SEND FOR ILLUSTRATED CATALOGUE, FREE.

Smoked Beef Shaver.


Meat Chopper.

Bung Hole Borer.

Tobacco & Root Cutter.

# THE STANLEY WORKS,

MANUFACTURERS OF

## Wrought Iron Butts, Hinges

AND

## DOOR BOLTS,

Plain, Japanned, Bronzed and Plated.

FACTORIES: New Britain, Connecticut.

WAREHOUSE: 79 Chambers St., New York.

## Bemis & Call Hardware & Tool Co.

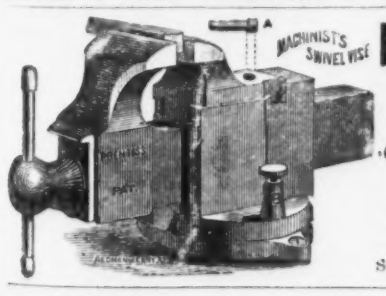
This Wrench can be furnished with Briggs' Pat. Nut or Sleeve

## PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a combination which has no equal.

For Circulars and Price List, address

BEMIS & CALL HARDWARE & TOOL COMPANY, Springfield, Mass.




## PRENTISS' PAT. VISES,

Adjustable Jaw.

Stationary or Pat. Swivel Bottoms.

ADAPTED TO ALL KINDS OF VISE WORK. ALSO

"PEERLESS" SWIVEL PIPE GRIP,

FITS ANY VISE. SOLD BY THE TRADE.

PRENTISS VISE CO.,

*93 Dey Street, New York.*

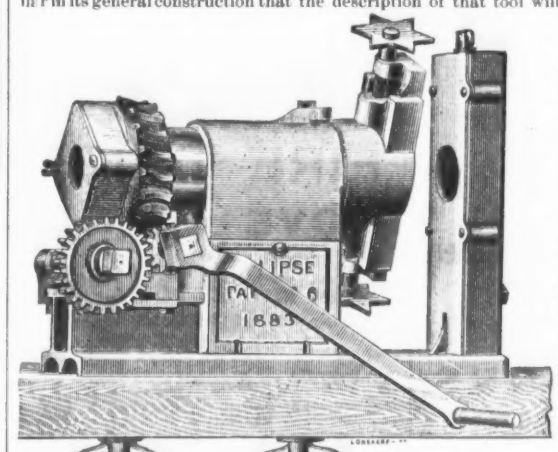
SOLE PROPRIETORS. SEND FOR CIRCULAR.

BUY
COVERT'S ROPE HALTERS,
Horse and Cattle Ties,
HALTER LEADS,
WEIGHT CORDS,
HITCHING CORDS,
Lariat Tethers and Picket Pins, &c.
Sold by all leading Jobbers in General and Saddlery Hardware.
COVERT MFG. CO.
West Troy, N. Y.
BUY
COVERT'S HARNESS SNAPS,
Open Eye Bit and Chain Snaps.
SNAPS and THIMBLES
For Horse and Cattle Ties,
BREAST CHAINS,
Halter Chains, Rein Chains,
Post Chains, &c.
Sold by all leading Jobbers in General and Saddlery Hardware, at factory prices.
COVERT MFG. CO.,
West Troy, N. Y.

THE

# "Junior" Eclipse Pipe-Cutting Machine

This Tool possesses all the advantages of the larger size "Eclipse" Machine, and is so similar in its general construction that the description of that tool will serve for the "Junior" also. It meets the requirements of those who have use for a Screwing Machine light enough to be readily carried about, sufficiently powerful in its gearing (18 to 1) to work easily, and strong enough to bear rough usage. All of these points, with the very important one of MODERATE COST, are to be found in the **"Junior" Eclipse Machine.**




It will cut off and thread Pipes from ⅛ to 2-inch, inclusive; can be erected on any fence, box or plank in five minutes by simply boring two ¾ holes, and weighs, complete, about 125 pounds. It has no complicated parts and nothing to break or get out of order, and will do the work of a tool costing twice its price.

We offer it, as also the large size "Eclipse" (cutting pipes 2½ to 4 inch), with the understanding that if not found satisfactory after a fair trial it may be returned to us within thirty days and the purchase money will be refunded.

*PRICE, Complete with Dies 1/4 to 2 inches, $60.*

# PANCOAST & MAULE,

213 & 215 So. Third St., PHILADELPHIA.

# THE LIVINGSTON HORSE NAIL COMPANY,

104 Reade St., NEW YORK,

MANUFACTURERS OF THE

## "EMPIRE BRONZED"

Hot Hammered and Pointed

# HORSE NAILS.

WILL NOT SPLIT,

And will Hold a Shoe Better than any Nail Made

ROOF CRESTING AND FINIALS,
Weather Vanes, Tower Ornaments, &c.

## WROUGHT IRON FENCES,

Iron Shutters, Window Guards, Jail Work, &c.,

BANK AND OFFICE RAILINGS.

WIRE and IRON WORK of Every Description.

☞ Send for Catalogue stating your wants, and we will make estimate. Mention this paper.

THE E. T. BARNUM WIRE & IRON WORKS,
Detroit, Mich., U. S. A.

THE CLARK M'F'G CO. MANUFACTURERS OF BUILDERS' HARDWARE BUFFALO, N.Y.

PAWTUCKET MFG. CO.,
PAWTUCKET R. I
MANUFACTURERS OF

## ALL KINDS OF BOLTS

For Cotton, Woolen, Silk and other Textile Machinery such as Loom Bolts, Frame or Joint Bolts; also Boiler Bolts with Pilot Points, Boiler Patch Bolts, Round Heads, Square Heads, Hexagon Heads, Countersunk Heads, both Square and Round, Elevator Bolts for fastening Metal Buckets to Leather or Rubber Belts.

Belts, Deck Bolts, Car Seat Bolts, with Slotted Heads. Bolts with Extra Large Heads, for Soft Wood, Leather, or other yielding material, a specialty.

☞ Send for Samples.

All kinds of Cold Punching at Short Notice.

Elevator Bolts of All Kinds.

Samples Cheerfully Furnished.

WILLIAMS, WHITE & CO.
MOLINE, ILLINOIS.
MANUFACTURERS OF

## DROPHAMMERS,

HORIZONTAL PRESSES FOR BENDING IRON, GANG BORING MACHINES, TOOLS FOR PLOW MAKERS THE JUSTICE HAMMER.

SEND FOR CIRCULARS.

# PERFECTION WINDOW CLEANER.

Simple, Useful & Durable.

**Saves 75 per cent. in time and labor over any other method.**

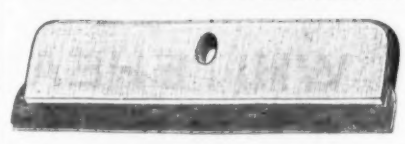
This is the only perfect Glass and Window Cleaner yet devised. It has

TWO RUBBER STRIPS,

One an elastic cleaning edge, the other a yielding cushion or support. Has hollow iron handles to attach to pole.

We own all the Patents.

## RUBBER SQUEEGEES OR FLOOR SCRUBBERS.



We are now manufacturing a full line of sizes of these scrubbers, and will be pleased to furnish the very lowest prices on application.

SIZES: 8, 10, 12, 14, 16, 18 INCHES.

PERFECTION WINDOW CLEANER CO.,
232 La Salle St., CHICAGO, ILL.

CONCORD USE N.H. GENUINE CONCORD AXLES

Manufactured only by CONCORD AXLE CO.,
D. ARTHUR BROWN, Treasurer,
FISHERVILLE (CONCORD), N. H.

HAMMOND'S Window Springs

Lock and support upper and lower sashes—all sizes. Are very convenient, simple and durable. Sample to the Trade free.
W. S. HAMMOND,
Lewisberry, York Co., Pa.
Circulars give full instructions.

Grindstones, Emery, &c

Walter R. Wood GRINDSTONES.

Berea, O., Nova Scotia, & other brands
*283 and 285 Front Street, New York*

GEO. CHASE,

The largest manufacturers in the world of

OIL

STONE

Of all description.

107th Street and Harlem River,
Send for Illustrated Price List. NEW YORK

OHIO GRINDSTONE COMPANY

JAMES NICHOLL, Prest. L. P. HALDEMAN, Secy
J. M. WORTHINGTON, V. Pt. B. P. FOSTER, Treas.

Manufacturers of

# GRINDSTONES

Of All Kinds.

127 Superior Street.

CLEVELAND, OHIO.

HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO.

Issues Policies of Insurance after a careful Inspection of the Boilers

COVERING ALL LOSS OR DAMAGE TO

**Boilers, Buildings and Machinery,**

ARISING FROM

**STEAM BOILER EXPLOSIONS.**

The Business of the Company includes all kinds of Steam Boilers.

Full information concerning the plan of the Company's operations can be obtained at the

**COMPANY'S OFFICE, HARTFORD, CONN.,**

or at any agency.

J. M. ALLEN, Pres. W. B. FRANKLIN, Vice-Pres. J. B. Pierce, Sec.

*Board of Directors.*

J. M. ALLEN, President.
LUCIUS J. HENDEE, President Ætna Fire Ins. Co.
FRANK W. CHENEY, of Cheney Bros. Silk Mfrs., Hartford and New York.
CHARLES M. BEACH, of Beach & Company.
DANIEL PHILLIPS, of Adams' Express Company.
GEO. M. BARTHOLOMEW, President Holyoke Water Powe rCompany.
RICHARD W. H. JARVIS, President Colt's Pat. Fire Arms Manufacturing Co.
HOMAS O. ENDERS, of the Ætna Life Insurance Co.
LEVERETT BRAINARD, of the Case, Lockwood & Brainard Co.
GEN. WM. B. FRANKLIN, Vice-President Colt's Pat. Fire Arms Mfg. Co.
GEO. CROMPTON, Crompton Loom Works, Worcester, Mass.
HON. THOMAS TALBOT, Ex-Governor of Massachusetts, Lowell.
NEWTON CASE, of the Case, Lockwood & Brainard Co.
WM. S. SLATER, Cotton Manufacturer, Providence.
NELSON HOLLISTER, of the State Bank, Hartford.
CHAS. T. PARRY, of Baldwin Locomotive Works, Philadelphia.
HON. HENRY C. ROBINSON, Attorney at Law, Hartford.

**AMERICAN FACING CO.**

AND

WHITEHEAD BROTHERS'

**FOUNDRY FACINGS**

**And Supplies of all Kinds.**

BITUMINOUS OR SEA COAL, LEHIGH, CHARCOAL, SOAPSTONE, INDIA SILVER AND GERMAN LEADS, &c.

XX MINERAL FOR HEAVY WORK.

X MINERAL FOR MEDIUM AND LIGHT WORK.

Our fine Facing known, as WHITEHEAD'S STOVE PLATE FACING, is the best in use. Send us a sample order.

ALSO DEALERS IN

**MOLDING SAND,**

**Fire Sand, Fire Clay and Kaolin.**

We give special attention to the selection of Albany and Crescent Sands for Stove Plate and Ornamental Iron and Brass Castings.

**WM. WHITEHEAD, Treas.,**

515 and 517 West 15th St., New York City.

THE FRED. J. MEYERS MANUFACTURING CO.,

COVINGTON, Ky.,

Manufacturers of

WIRE GOODS OF ALL KINDS,

Wrought-iron Fencing, Cresting and Hardware Specialties.

Send for Illustrated Catalogue of 1883.

**CHAMPION IRON FENCE CO.**

KENTON, OHIO.

GREATEST VARIETY OF **IRON FENCES** AND FINEST VARIETY OF

**CAST AND MALLEABLE IRON CRESTING**

in the United States. Send for 120 page Catalogue. Also manufacturers of the BEST variety and styles

**IRON LIFT & FORCE PUMPS**

Have a few pumps that are said to be BEST IN THE MARKET. Let no one wishing to handle iron pumps fail to send for pump circular and prices.

**The Common Sense Sash Holder and Lock Combined.**

Patented March 6th, 1883.

Is the best, cheapest and most complete Sash Holder and Lock in the market, and we think has the largest sale. It holds the window at any point, and locks the same when down, and entirely prevents windows from rattling.

I am the sole owner of this patent, and sole manufacturer of these fasteners, and all persons are hereby notified of this fact. Any parties infringing will be dealt with according to law. Parties who have been buying and selling the "Practical Fastener," so-called, will do well to heed the warning. Orders from the trade respectfully solicited. Circular with price list mailed on application.

H. A. WILLES,

MANUFACTURER AND DEALER IN HARDWARE SPECIALTIES,

727 Market Street, PHILADELPHIA, PA.

B. KREISCHER & SONS,

**FIRE BRICK.**

BEST AND CHEAPEST.

Established 1845.

Office, foot of Houston Street, East River, NEW YORK.

**NEWTON & CO.,**

ALBANY, N. Y.,

MANUFACTURERS OF BEST QUALITY

**FIRE BRICK**

AND

**STOVE LININGS.**

English, Scotch and Welsh

**FIRE BRICKS,**

Dinas and Silica Bricks

for Glass and Steel Works.

**S. A. RIMINGTON,**

40 and 42 Broadway, New York.

Yard foot of 4th St., Hoboken, N. J.

**M. D. VALENTINE & BRO.,**

Manufacturers of

**FIRE BRICK**

**And Furnace Blocks,**

DRAIN PIPE AND LAND TILE,

Woodbridge. - - N. J.

**BORGNER & O'BRIEN**

Manufacturers

**FIRE BRICK**

AND

Edge Pressed Furnace Blocks,

CLAY RETORTS, TILES, &c.

Twenty-third Street,

Above Race, PHILADELPHIA

Twenty years' practical Experience.

**WATSON FIRE BRICK CO.,**

ESTABLISHED 1836.

Successors to JOHN R. WATSON, Perth Amboy, New Jersey

Manufacturers of

**FIRE BRICK,**

FOR ROLLING MILLS, BLAST FURNACES, FOUNDRIES GAS WORKS, LIME KILNS, TANNERIES, BOILER and GRATE SETTING, GLASS WORKS, &c.

Fire Clays, Fire Sand, and Kaolin for Sale.

**HENRY MAURER,**

Proprietor of the

**Excelsior Fire Brick & Clay Retort Works,**

Manufacturer of FIRE BRICK, HOLLOW BRICK AND CLAY RETORTS.

WORKS: PERTH AMBOY, NEW JERSEY

Office & Depot 418 to 422 East 23d St., N. Y.

**TROY FIRE BRICK WORKS,**

*Troy, N. Y.,*

JAMES OSTRANDER & SON,

Established 1848. Manufacturers of

**FIRE BRICK,**

Tuyeres, Tiles, Blast Furnace Blocks, &c. Miners and Dealers in Woodbridge Fire Clay and Sand, and Staten Island Kaolin.

Established 1864.

**GARDNER BROTHERS**

Manufacturers of

**STANDARD SAVAGE FIRE BRICK TILE & FURNACE BLOCKS,**

OF ALL SHAPES AND SIZES.

Clay Gas Retorts and Retort Settings, and Miners and Shippers of Fire Clay.

OFFICE: 116 Smithfield St., Pittsburgh, Pa.

WORKS: Mt. Savage Junction, Md., and Lockport Pa

**HALL & SONS,**

**FIRE BRICK,**

Buffalo, N. Y.

**CHAS. D. COLSON,**

DINAS, SCOTCH, SAVAGE, JERSEY, and other

**FIRE BRICKS.**

The Largest and Best Assorted Stock of Tiles and Bricks, Fire Clay, Foundry Supplies, &c., in the United States.

**CHICAGO ILL.**

UNION MINING COMPANY.

**Mount Savage Fire Brick.**

EDWARD J. ETTING Agent,

*222 South Third St., Philadelphia, Pa.*

**PERTH AMBOY TERRA COTTA CO.,**

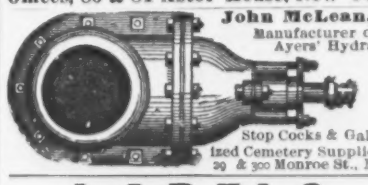
Established 1846.

MANUFACTURERS OF

**FIRE BRICK,**

For Blast Furnaces and Rolling Mills.

Offices, 80 & 81 Astor House, New York.



John McLean, Manufacturer of Ayers' Hydrants.

Stop Cocks & Galvanized Cemetery Supplies. 29 & 300 Monroe St., N. Y

**LABELS**

FOR THE IRON AND HARDWARE TRADE A SPECIALTY.

The best work at closest prices. Send for prices.

P. L. HANSCOM & CO., Label Printers,

CHICAGO, ILL.

**WOODLAND FIRE BRICK CO., LIMITED,**

Woodland, Clearfield Co., Pa.,

MANUFACTURERS OF

"WOODLAND" BRAND FOR STEEL FURNACES OF ALL KINDS, BLAST FURNACES AND MALLEABLE IRON WORKS.

"BRADFORD" Brand for Rolling Mills, Glass Houses, &c.

"W F. B." Brand for Hot Blast Stoves, Stacks, Cupolas, and all work requiring a cheap grade of brick, Also, Fine Ground Clay to lay brick.

Western Office, 36 Sixth Street, Pittsburgh, Pa.

**FIRE BRICK, TILE, SHAPES.**

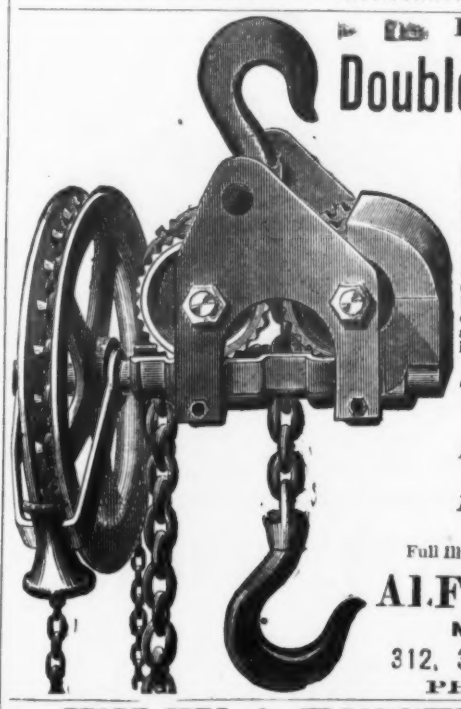
**CLIMAX FIRE BRICK CO.,**

Successors to Red Bank Fire Brick Co.,

**Blast Furnace and Steel Hole Brick**

A SPECIALTY.

THOS. JOHNSTON, Agt., P. O. Box 976, Pittsburgh, Pa.



BOX'S PATENT

**Double Screw Hoists.**

The unbounded reputation these Hoists have gained for themselves the last four years has no equal. There are now over 7000 in use. Large manufacturers have duplicated their orders a dozen times over. They are in use by all city departments, railroad companies, the United States Government, the English Government, the French Government, the Chinese Government, and in Russia, Germany, Chili, Brazil, Venezuela and Cuba. They have been awarded three silver medals and five diplomas. One trial will convince you they are the best in every particular. Sizes, 300 lbs. to 40,000.

*Superior Hand and Power Traveling Cranes, from 1 to 40 tons.*

*Elevators for Heavy Work, 1 to 10 tons capacity.*

*Radial Drills of the Most Improved Kind.*

Full Illustrated Circulars on application.

**ALFRED BOX & CO.,**

Northern Liberty Works,

312, 314 and 316 GREEN STREET,

PHILADELPHIA, PA.

**WILEY & RUSSELL MFG. CO.,**

GREENFIELD, MASS.,

**Lightning Screw-Cutting Machinery and Tools.**

Celebrated Lightning Screw Plates.

Lightning Bolt Cutters, both for Hand and Power, in great variety.

Taps and Dies for use in Machines, Screw Plates, Bit Brace, Drilling Machines, &c.

Green River Tire Upsetters,

Green River Horse Shoers' Vises,

Green River Drills,

Green River Tire Benders,

Tire Measuring Wheels, &c., &c.

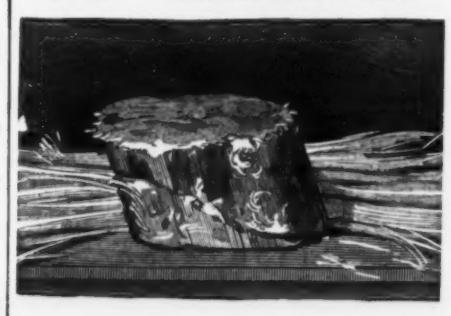
Bit Brace Reamers, and other Labor-Saving Tools, for Blacksmiths and Carriage Makers.

Send for Illustrated Price List.

THE LIGHTNING SCREW PLATE
THIS SCREW PLATE CUTS WIRE SIZES FROM NO. 2 TO NO. 18.
TAPS & DIES MAY BE USED IN MACHINE OR BIT BRACE IF DESIRED.
HOLDERS FOR THESE PURPOSES BEING INCLUDED IN THE SET. DIES & TAP WRENCH ADJUSTABLE WITHOUT SPRINGING AVOIDING ALL DANGER OF BREAKING
LIGHTNING

Full set of No. 0 with 14 sizes taps and dies, making perfect screws at a single cut, tap wrench, bit brace holder and holder for lathe use. Price, $20.

**THE ASBESTOS PACKING CO.,**



MINERS AND MANUFACTURERS OF

**ASBESTOS.**

Office, 169 Congress St., BOSTON.

Steam Packings, Wick, Fiber, Mill Board, Flooring Felt

Cement Felting, Pipe and Boiler Coverings, Cloth, Yarns, &c.

**BOLLING & LOWE,**

2 LAWRENCE POUNTNEY HILL, LONDON, E. C

General European Agents.

**THE SWIFT MILL.**

ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER

Will roast 30 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

**LANE BROS., Poughkeepsie, N. Y.**

Also sold by leading wholesale houses.

Our agents, Graham & Haines, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

**J. M. SCHOONMAKER,**

MANUFACTURER AND SHIPPER OF

**CONNELLSVILLE COKE**

Capacity of Mines, 2500 Tons Daily.

Siding connections with all lines of Railroads.

Office, 120 Water Street, PITTSBURGH, PA.

THE BILLINGS & SPENCER CO., Hartford, Ct.

THE BILLINGS Pat. POCKET WRENCH

And all descriptions of

**DROP FORGINGS**

for Guns, Pistols, Sewing Machines, and Machinery generally. Send for Catalogues.

# BEST CAST TRADE BROWN'S MARK TOOL STEEL BROWN & CO. PITTSBURGH, PA.

## HENLEY'S CHALLENGE ROLLER SKATE.

The Latest and Best and Most Complete Scientific

**SKATE**

IN THE MARKET.

PATENTED

*October 16, 1880*

AND

*August 23, 1881*

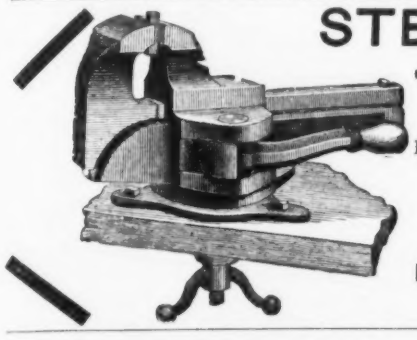
LIBERAL TERMS TO THE TRADE.

For Prices, Circulars and further particulars, address, mentioning *The Iron Age*,

**M. C. HENLEY, Patentee and Manufacturer.**

309 North Fourteenth Street, RICHMOND, IND.

## STEPHENS' VISE.

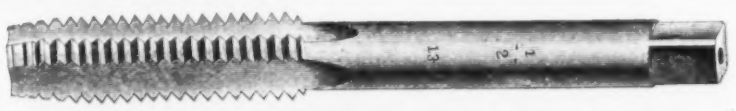


Every Mechanic using this Vise saves one-half his time and labor.

For Sale by the Trade.

**NATHAN STEPHENS,**

Office, 41 Dey St, New York.



## J. E. REDFIELD,

MANUFACTURER OF

## TAPS, REAMERS, SCREW PLATES, &c.

ESSEX, CONN.

Our Taps are all Machine Relieved, and we guarantee them to give satisfaction.

## SANDS' TRIPLE MOTION WHITE MOUNTAIN ICE CREAM FREEZERS.

THE WHITE MOUNTAIN FREEZER COMPANY are headquarters for Ice Cream Freezers and Ice-Crushers, being the only firm in the United States who manufacture all parts of the raw material. The Examining Committee, consisting of 50,000 Citizens of the United States, have recommended the ***Sands' Triple Motion White Mountain Freezer*** to all persons in the world, for the following reasons: We have used them; they freeze quicker than any other; they save time, salt and ice; the triple motion makes smooth cream without bunches; makes more of it; galvanized iron outside; tin inside; no zinc in contact with the cream; easily adjusted; substantially made; simple in construction; perfect in results. Send for descriptive circular and discount of this celebrated Freezer

Address,

HAND FREEZER 2 to 25 qts. $3.75 to $25.00.

HAND OR POWER. 25 and 50 qts. $75.00 and $175.00

HAND OR POWER ICE CRUSHER. $75.00

**White Mountain Freezer Co**

Nashua, N. H., U. S. A.

SPECIAL ATTENTION GIVEN TO EXPORT ORDERS.

No. 1 Carries 7 feet earth.
No. 2 Carries 5 feet earth.
No. 3 Carries 3½ feet earth.

PATENTED December 27th, 188.

## The York Pat. Steel Scraper

The Lightest and Strongest Scraper made. The body is made of one single piece of steel. *The Handles are fastened inside of fold, and free from all obstructions.* The body, bail and runners are all made of steel. Especially suited for contractors. Send for circulars. Manufactured by

**THE YORK MFG. CO. Limited Portsmouth, Ohio.**

## LEWIS'S PATENT BELT PROTECTOR

is meeting with a demand entirely beyond all anticipation. The following, however, tells the story of its signal success:

ALBANY ELECTRIC ILLUMINATING CO., ALBANY, April 21, 1883.

Mr. E. S. LEWIS: *Sir.*—We are now using your BELT PROTECTORS on several of our belts, and as they give perfect satisfaction, I intend applying them as occasion may require.

Yours, &c., E. A. MAHAR, General Manager.

FOUNDRY FACINGS AND FOUNDERS' SUPPLIES,
ALBANY, N. Y., March 31, 1883.

Mr. EDWARD S. LEWIS: *Dear Sir.*—It affords us great pleasure to state that your "BELT PROTECTORS," which were applied to the belts in our mill last fall, have been the means of saving us considerable expense, inasmuch as we should have been compelled to replace them at considerable outlay, whereas now they are in as good condition as when put in, with every prospect of remaining so for a long time to come.

F. D. RANSOM & CO.

NEW YORK DEPOT AND AGENCY: DEWEY MFG. CO., 29 Chambers St.

SOLE MANUFACTURER AND PROPRIETOR,

**EDWARD S. LEWIS, 16 Herkimer St, Albany, N. Y**

## IRON ROOFING.

Extra quality. Best plan in use. (Sold as low as any other

MANUFACTURED BY

**T. C. SNYDER & CO., Canton, Ohio.**

Cheap, strong and durable. Does not get out of repair. Every roof sold in seven years satisfactory. Any mechanic can apply it. Circular and sample free.

Also manufacturers of the best and cheapest **Metallic Paint** in use.

**J. E. QUACKENBUSH & SON**

MANUFACTURERS OF

Porcelain, Mineral & Jet Knobs & Escutcheons

Send for Price List and Terms. OFFICE, 535 8th Ave., N. Y.

## GRAIN SCOOPS,

MANUFACTURED BY

## HUSSEY, BINNS & CO.,

PITTSBURGH, PA., U. S. A.

*NEW YORK AGENCY:*

**DURRIE & McCARTY,**

97 CHAMBERS STREET.

## UNION STONE COMPANY,

Wood Polishing Wheels

A SPECIALTY.

New Style Wood Wheel Polishing Machine.

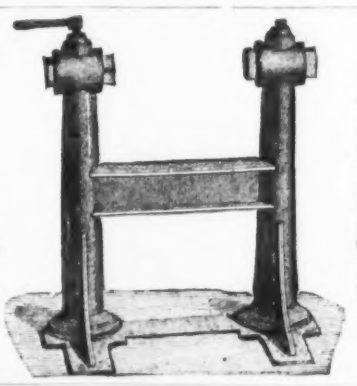
CATALOGUE ON APPLICATION.

BEST MATERIAL AND WORKMANSHIP.

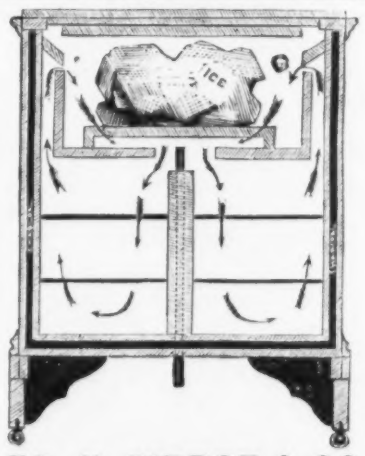
IRON BUSHINGS AND PERFECTLY BALANCED.

38 & 40 Hawley Street, BOSTON.

Special Contracts for Large Orders.



Cupola Polishing Frame.



## GEO. N. PIERCE & CO.,

BUFFALO, N. Y.,

New York Office, - 195 Water Street.

MANUFACTURERS OF

**BIRD CAGES and REFRIGERATORS.**

Send for Illustrated Catalogue and Price Lists.

ALSO FOR SALE BY

Chicago Stamping Co., Chicago, Ill.
Sickles, Preston & Co., Davenport, Iowa.
Cincinnati Tin and Japan Co., Cincinnati, Ohio.
Kennedy, Spaulding & Co., Syracuse, N. Y
Weaver & Goss, Rochester, N. Y
E. A. Burrows & Co., Troy N. Y.

## THE GIANT PAD LOCK.

Manufactured by

**THE SMITH & EGGE MFG. CO.**

(Centennial Award.)

**"Superior in Every Respect."**

This is one of the **best selling Locks** in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited. Address as above

***Lock Box 1705, Bridgeport, Conn.***

AGENTS:

FLAGLER FORSYTH & BRADLEY 298 Broadway N. Y

## SMITH'S NEW MODEL REVOLVERS.

Sold by Gun and Hardware Trade Everywhere.

OTIS A. SMITH, Manufacturer, Rockfall, Ct

## POPE & STEVENS,

MANUFACTURERS OF

PLAIN LEATHER, FANCY LEATHER, NICKELED CHAIN,

GILT CHAIN, CELLULOID, ENGLISH CHAIN, EMBOSSED, PLUSH,

## DOG COLLARS.

ALSO,

## DOG MUZZLES, ROLLER SKATES, &c.

HEADQUARTERS OF

C. S. OSBORNE & CO.'S CELEBRATED TOOLS,

BARNEY & BERRY'S SKATES,

CHICOPEE AUTOMATIC DRILL.

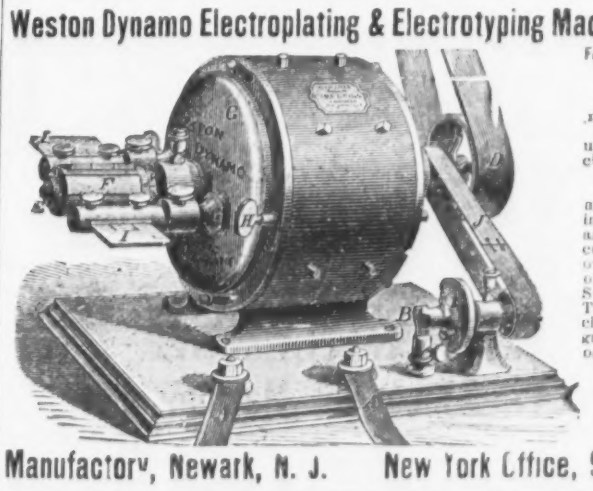
114 Chambers Street, - - NEW YORK,

AND

514 Commerce Street, PHILADELPHIA, PA.

## HANSON, VAN WINKLE & CO., Sole Agents for

**Weston Dynamo Electroplating & Electrotyping Machines, Newark N. J.**



For Nickel, Bronze, Brass, Copper and Silver Plating.

Over 1000 machines in use. Are used by all leading stove manufacturers.

Experienced men sent to put up machines and instruct purchasers.

INFRINGEMENTS.

We call attention to infringements of the Weston Machine in which Automatic Switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

MANUFACTURERS OF

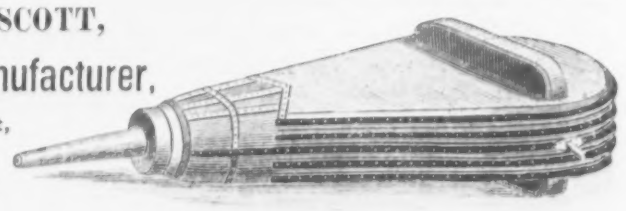
Cast Nickel Anodes, Pure Nickel Salts, Polishing Materials.

Manufactory, Newark, N. J. New York Office, 92 & 94 Liberty St.

## GEO. M. SCOTT,

**Bellows Manufacturer,**

Johnson Street,
Cor. 22d St.,
CHICAGO, ILL.



## R. H. WOLFF & CO.,

MANUFACTURERS OF

# STEEL WIRE

FOR ALL PURPOSES.

**Special Finest CAST STEEL WIRE.**

Market Steel Wire, Prime Coppered Spring Wire, Tempered and Untempered Steel Wires, in Long Lengths, for Crinoline, Corset, Lock and Brush Makers and all Special Purposes.

ALL KINDS OF FURNITURE SPRINGS.

IMPORTERS OF

**IRON, STEEL, & RAILS of Every Description.**

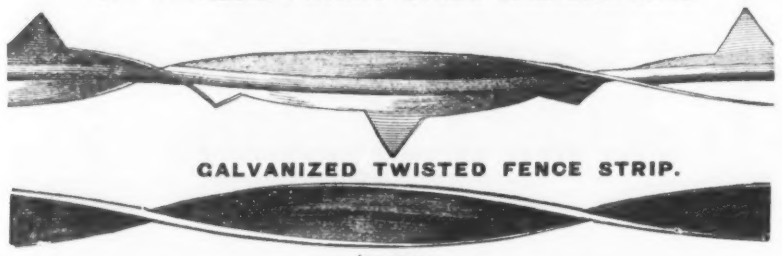
Wire Rods, Plain and Galvanized Wires, &c., Gun Barrels, Moulds, and Ordnance.

Shipments in bond from American Ports, and direct from Europe to all parts of the World.

EXPORTERS AND GENERAL MERCHANTS.

WORKS, PEEKSKILL, N. Y.

Agents of the ALLIS PATENT STEEL BARBED FENCE.



GALVANIZED TWISTED FENCE STRIP.

ADDRESS,

Office and Warehouse, 93 John Street, New York

## MILLER, METCALF & PARKIN,

**Pittsburgh, Pa.,**

Manufacturers of

# CRESCENT STEEL,

in Bars, Sheets, Cold-Rolled Strips, &c.

Polished, Compressed Drill Rods and Wire.

Warranted equal to any imported in *quality, finish and accuracy*

Also Common Grades.

## J. & RILEY CARR,

SHEFFIELD, England. *ESTABLISHED 1810.*

Sole Importers and Manufacturers of the

**Celebrated "Dog Brand"**

# STEEL FILES.

**BRIGHT COLD ROLLED STEEL,**

PATENT WROUGHT IRON STEEL FACE ANVILS,

FARRIERS' KNIVES, HAMMERS, PINCERS, &c.

Warehouse: 30 Gold St., New York. HENRY W. BELCHER, Agent.

## S. & C. WARDLOW,

**Sheffield, England,**

Manufacturers of the Celebrated

**Cast and Double Shear**

# STEEL.

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives, Mining Tools, Dies, Files, Clock and other Springs, and Tools of every variety.

**Warehouse, 95 John Street, New York.**

WILLIAM BROWN, Representative.

## CLEVELAND ROLLING MILL CO.,

CLEVELAND, OHIO.

MANUFACTURERS OF

**BESSEMER AND SIEMENS-MARTIN STEEL BLOOMS AND BILLETS, BESSEMER STEEL RAILS, IRON RAILS & FASTENINGS.**

Steel Street Rails, Wire, STEEL TIRE and FORGINGS, Iron and Steel Angles, Bar and Spring Steel, SOFT WELDING STEEL for Tools and Agricultural Work, Corrugated Roofing and Siding, IRON AND STEEL BOILER PLATE, Galvanized and Black Sheet Iron, STANDARD CAST STEEL.

WESTERN AGENCY, 91 Lake St., Chicago, N. D. PRATT, Agent.

NEW ENGLAND AGENCY, 239 Franklin St., Boston, JOHN WALES & CO., Agents.

New York Agency, 23 Astor House ..... C. DICKERSON, Agent.

CINCINNATI AGENCY, 181 Walnut St., CHARLES B. MELISH, Agent.

W. W. SCRANTON, President. WALTER SCRANTON, Vice-President. E. P. KINGSBURY, Sec'y and Treas.

## THE SCRANTON STEEL COMPANY,

MANUFACTURERS OF

**STEEL RAILS & BILLETS.**

Works at Scranton, Pa.

New York Office, - - - - 56 Broadway.

## THE MIDVALE STEEL CO.,

NICETOWN, PHILADELPHIA.

**Best Warranted Cast Steel for Machinists' Tools,**

Taps, Dies, Punches, Shear Blades, Chipping Chisels and Granite Rock Drills,

**Extra Mild Center Steel, special for Taps;**

ALSO,

**MACHINERY AND CAST SPRING STEEL HEAVY AND LIGHT FORGINGS.**

Warehouse, No. 12 North 5th St., Philadelphia.

Address *A. M. F. Watson*, General Sales Agent.

# STEEL Gautier Steel.

See Page 3.

LABELLE STEEL WORKS.

## SMITH, SUTTON & CO.,

MANUFACTURERS OF ALL KINDS OF

# STEEL.

Also Springs, Axles, Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.

Post Office Address, PITTSBURGH, PA.

Represented at Boston by WETHERELL BROS., 31 Oliver St.; at Philadelphia by JAMES C. HAND & CO., 614 and 616 Market St. at Cleveland by CONDIT, WICK & CO., 103 Water St.

## ALBANY & RENSSELAER IRON & STEEL CO.,

TROY, N. Y.,

MANUFACTURERS OF

**BESSEMER STEEL RAILS,**

FISH PLATES, BOLTS, NUTS, SPIKES, &C.

Machinery Steel, Merchant and Ship Iron.

CHESTER GRISWOLD, Vice-President, - 56 Broadway, New York City.

## BOND, PARSONS & CO.,

104 John St., NEW YORK. 224 So. 3d St., PHILADELPHIA.

AMERICAN AND FOREIGN PIG IRON,

Spiegeleisen, Blooms, Rails, Wire Rods, &c.

TIN PLATES.

VIVIAN, YOUNGER & BOND, London & Birmingham.

## FRANCIS HOBSON & SON,

97 John Street, NEW YORK.

Sole Manufact'rs of "CHOICE" Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

CHAS HUGILL, Agent.

## ANDERSON, DU PUY & CO.,

(Successors to ANDERSON & CO.), Manufacturers of all Descriptions of

Tool, Machinery, **STEEL.** Agricultural, &c.

Works and Office at Chartiers Station, P. & L. E. R. R. Branch Office, Cor. Ross & First Aves.,

PITTSBURGH, PA.

C. W. LEAVITT, New York Agent, 161 Broadway. | M. T. MILES & SON, Western Agents, 170 Lake St., Chicago.

## Compressed Steel Shafting,

STRAIGHTENED AND POLISHED. EXACT SIZES.

## TEMPLE & LOCKWOOD,

12 Platt Street, New York.

Warranted Superior to any Steel in the Market, either English or American, for every purpose.

Also,

*Combination Chrome Steel and Iron for Safes, Jails and Deposit Vaults.*

*Send for Circular and Price List*

**CHROME CAST STEEL.**

Chrome Steel Works,

Kent Avenue and Keap Street,

BROOKLYN, E. D., N. Y.

*Chicago Branch,*

S. D. KIMBARK, Agent.

*Cincinnati Branch,*

N. E. cor. 5th & Main Streets.

## THE MONTOUR IRON & STEEL COMPANY.

WORKS AT DANVILLE, PA.

PIG IRON, T AND STREET RAILS,

A general assortment of mine and narrow gauge rails kept on hand from which shipments can be made promptly.

W. E. C. COXE, President, Reading, Pa. S. W. INGERSOLL, Treasurer, 208 South Fourth St., Philadelphia, Pa.

## PITTSBURGH BESSEMER STEEL CO.

(LIMITED),

# STEEL RAILS

LIGHT RAILS A SPECIALTY.

P. O. Address, 87 Wood Street, Pittsburgh, Pa.

## CROWN STEEL,

CASSIDY & CO., Mfrs., Pittsburgh, Pa.

WARRANTED EQUAL TO ANY PRODUCED.

Best refined Cast Steel, for Edge and Turning Tools, Taps, Dies, Drills Punches, Shear Knives, Cold Chisels and Machinists' Tools. Also Machinery Steel and Forgings.

HICKS & DICKEY, Gen'l Agents, 413 Commerce St. Philadelphia.

Represented in New York by F. L. Froment & Co., 112 John Street.

Represented in Boston by Bellows & Mansion, 77 Oliver Street.

Represented in Atlanta, Ga., by Davenport, Johnson & Co.

## R. MUSHET'S

**Special Steel**

FOR

## LATHES, PLANERS, &c.

Turns out at least **double work** by increased speed and feed and **cuts harder metals** than any other Steel. Neither hardening nor tempering required.

Sole Makers,

**SAMUEL OSBORN & CO.,**

Sheffield, England.

Represented in the United States by

**B. M. JONES & CO.,**

*Nos. 11 & 13 Oliver Street,* BOSTON.

## NAYLOR & CO.,

99 John St., New York. 6 Oliver St., Boston, Mass

208 S. Fourth St., Philadelphia, Pa.

IMPORTERS OF

**STEEL AND IRON RAILS,**

Tin and Terne Plates,

Swedish and Norway Iron,

**BESSEMER STEEL WIRE RODS.**

*Pig Iron, Spiegeleisen, Ferromanganese, Scrap Steel and Old Iron Rails.*

MANUFACTURERS OF

STEEL COMPRESSED SHAFTING,

"Benzon" Homogeneous Plates

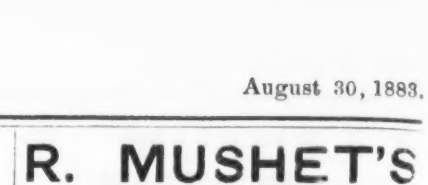
For Boilers, Fire-boxes, &c.

Axles, Crank Pins, Spring Steel

And all other kinds of

**Martin-Siemens Steel and Iron**

For Railroad purposes.




## BOLT & RIVET CLIPPERS.

For cutting off the ends of Bolts and Rivets, on carriages, wagons, harness, etc. Ask for them where you buy your hardware, or send for circular and price list.

**CHAMBERS, BROTHER & CO.,**

**52d St., below Lancaster Ave., Philadelphia, Pa.**

WRITE FOR ESTIMATES.

IRON-WORKING MACHINERY A SPECIALTY H.B. SMITH MACH. CO. 925 MARKET ST. PHILADELPHIA. U.S.A.

Whole Outfits Furnished.

ENGINES AND BOILERS

Wood Working Machinery.

STEAM PUMPS AND SUPPLIES

## F. W. MOSS,

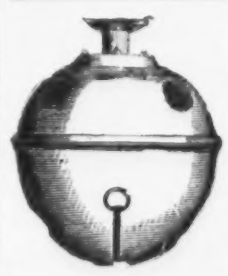
CELEBRATED and OLD-ESTABLISHED BRANDS OF

**"MOSS" and "MOSS & GAMBLE'S"**

# STEEL AND FILES

Office and Warehouse:

80 JOHN ST, - - New York.



Established 1838

Bevin Bros. M'f'g. Co.,

*Easthampton, Ct.*

Manufacturers of

**SLEIGH BELLS,**

House, Tea, Hand, Gong Bells, &c

Bell Metal Kettles.

A. PARDEE, Hazleton, Pa. J. G. FELL, Phila

## A. PARDEE & CO.,

237 South Third Street.

PHILADELPHIA,

No. 111 Broadway, New York.

MINERS AND SHIPPERS OF

**Lehigh Coals.**

The following superior and well-known Lehigh Coals are mined by ourselves and firms connected with us, viz.:

A. Pardee & Co. { HAZLETON, CRANBURY, SUGAR LOAF.

Pardee, Bro. & Co. LATTIMER.

Calvin Pardee & Co. HOLLYWOOD

Pardee, Sons & Co. MT. PLEASANT

C. P. LELAND, Pres't. **THE CLEVELAND CRUCIBLE STEEL CO.,** E. M. GRANT, Gen'l Mgr.
MANUFACTURERS OF
TOOL, MACHINERY, **STEEL.** FILE AND SPRING.
CLEVELAND, OHIO.
AGENTS:
BOSTON, JAS. J. KELLY, 38 Kilby Street. | CHICAGO, CAMPBELL & LILL SUPPLY CO., 237 Lake Street.
NEW YORK, TEMPLE & LOCKWOOD, 12 Platt Street. | ST. LOUIS, BABCOCK, KENNEDY & CO., 108 North 3d Street.
CINCINNATI, JOHN C. EBB & CO., 10 West 3d Street.

**THOS. FIRTH & SONS, Limited,**
SHEFFIELD,
**Crucible Cast Steel.**

**JERE. ABBOTT & CO.,**
AGENTS AND IMPORTERS OF
**SWEDISH IRON,**
35 Oliver St., BOSTON. 23 Cliff St., NEW YORK.

**DODGE, HELLER & LYONS,**
NEWARK, N. J.,
MANUFACTURERS OF
**Clay Crucible Cast Steel.**
FINE
Especially adapted for TAPS, DIES, DRILLS, TURNING TOOLS and other purposes where a **Superior** and **Even** Quality of Steel is required.
ALSO MAKERS OF
Dodge's Patent Forging and Grinding Machines,
For SLEDGE and other HAMMERS, FILES, PLIERS and other irregular and tapering shapes.

**GUSTAF LUNDBERG,**
AGENT FOR
N. M. HÖGLUND'S SONS & CO.,
OF STOCKHOLM,
**SWEDISH & NORWAY IRON,**
38 KILBY STREET, BOSTON.
ALBERT POTTS, Philadelphia Agent, 234 & 236 N. Front Street.

PETER BALDY, President. L. K. RISHEL, Treas. and Gen'l Manager.
THE
**CO-OPERATIVE IRON & STEEL WORKS,**
MANUFACTURERS OF
**BEST OPEN-HEARTH STEEL,**
FOR
LOCOMOTIVE AND MARINE BOILERS, SHIP AND TANK PLATE, SPRING, TIRE, MACHINERY, AGRICULTURAL STEEL, ETC.
Works at - - DANVILLE, PA.

**MATTHIESSEN & HEGELER ZINC COMPANY,**
LA SALLE, ILLINOIS,
MANUFACTURERS OF
Refined Spelter, Sheet Zinc and Sulphuric Acid.
ALL ORDERS FILLED PROMPTLY.

**EDES, MIXTER & HEALD ZINC CO.,**
MANUFACTURERS OF
**PURE SPELTER.**
MADE FROM THE COMPANY'S CELEBRATED IMPERIAL ZINC MINES.
It is Soft and Ductile, and of very unusual strength. Is especially adapted for **Cartridge Brass, German Silver and all Fine Work.**
SALES OFFICE: PLYMOUTH, MASS. WORKS AND MINES: KNOXVILLE, TENN.
ADDRESS ALL COMMUNICATIONS TO SALES OFFICE.

**BIRMINGHAM IRON FOUNDRY,**
BIRMINGHAM, CONN.
**SHEARS,**
TO CUT FROM 4-INCH ROUND OR SQUARE, TO HOOP IRON, WITH OR WITHOUT ENGINE ATTACHED.
**SQUEEZERS.**
ROTARY OR ALLIGATOR.
Chilled Rolls and Rolling Machinery Generally.

**CHEMICALS AND APPARATUS**
FOR THE ANALYSIS OF
*ORES, IRON, STEEL, FUEL, FLUXES, FURNACE GASES, &c.,*
Our Specialty. Being direct Importers and Manufacturers we can offer superior inducements.
EIMER & AMEND, NEW YORK. Nos. 205 to 211 Third Avenue. Eighteenth Street Station Elevated R. R.
Illustrated Catalogue Mailed on Application.

CIOPCO TRADE MARK
CLEVELAND
**IRON ORE PAINT COMPANY,**
Manufacturers of
PURE IRON ORE PAINTS,
*Red (Rossie) Purple and Brown.*
We guarantee all our Paints, and respectfully solicit the patronage of consumers and dealers. Send for Price List 22.
Office, 154 Merwin St., Cleveland, O.
**BEST IRON PAINT.**

# LIST OF
# TRADE MARKS, BRANDS, &c.

IN ORDER to meet a decided and constantly growing want, as made known and emphasized by almost daily inquiries asking for names and addresses of makers of iron, tools, tin plates, hardware, steel, machinery, oils, varnishes, japans, &c., &c., it has been decided to include in the

## Ironmonger Diary and Text Book for 1884

(now in course of preparation) as complete a list as possible of trade-marks, brands, specialties, &c., made and in use in all parts of the world.

This list will exclude all ordinary trade announcements proper, and will be strictly confined to trade-marks and brands, whether blocks, electros, or other appliances for illustrations, with just sufficient letter-press to describe the kind of article to which the mark, &c., is applied, and the names and addresses of the owners or lawful users. For the sake of uniformity in space and charges, each mark will occupy a space measuring 1 inch deep by 1½ inches wide, and the uniform charge will be $2.50 (10s.) only for each such space, payable in advance, unless we have already an open advertising account with the firm giving the order.

The advertisements so inserted will be printed on colored paper, **classified under suitable heads,** and so arranged as to make them both effective and useful.

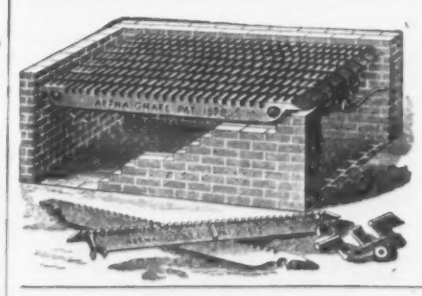
Blocks or electros, &c., of marks or brands which may be too large will be reduced by us at cost price (roughly $1 each) to the requisite size on receipt of remittance along with the cash for the cost of advertisement.

## AMERICAN MANUFACTURERS AND EXPORTERS

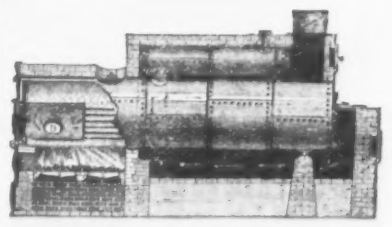
of agricultural machinery and implements, "notions," general machinery, axes, hatchets and tools generally, nails, cutlery, electro-plated wares, clocks, safes, watches, oils, varnishes, japans, petroleum, paints, &c., &c., are strongly advised to take advantage of this excellent opportunity of placing their marks, &c., in a list which is certain to be constantly referred to all over the world, and especially (besides **Great Britain**) in **Australia, New Zealand, India, Ceylon, South Africa,** the **West Indies,** and the British Colonies of North America.

Particulars, blocks or electros, and remittances, may be forwarded through any of the offices of the *Iron Age*, or direct to the publisher,

**42 CANNON ST., LONDON, E. C.**



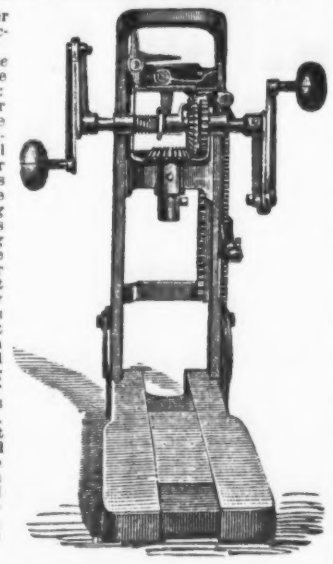
**THE AETNA GRATE.**
This is a practical and thoroughly successful
SHAKING GRATE BAR.
Has been in use over five years, and in many of the largest manufactories in the country. Simple in construction, positive and effectual in its operation, easily worked (being operated in sections in wide furnaces), **gives over sixty per cent. Air Surface,** very durable, interchangeable, and can be put in any furnace without delay or change of any kind. Descriptive circular, price, etc., sent on application.
**AETNA GRATE BAR COMPANY,**
GEORGE H. CLARKE, Manager.
RICHARD THOMPSON, Agent, 110 Liberty St., New York.



BRIDGEPORT BOILER WORKS
BRIDGEPORT, CONN.
LOWE & WATSON, Proprietors,
MANUFACTURERS OF
The Lowe Patent Tubular Boiler, with and without Superheating Drums. Fourteen years' use proves them the most durable and reliable boiler known. Gives dry steam. The process for combustion of the gases is in the construction and setting. Burns any fuel; obtains as much result from it as any boiler or setting with no more cost, and greater durability.
☞Send for descriptive Circular.

**EMERY AND CORUNDUM WHEELS.**
Can be run in **WATER, OIL** or **ACID** as well as **DRY.**
Polishes and Machinists' Supplies.
RUB STONES, EMERY WHEEL MACHINERY
And DIAMOND TOOLS.
CIRCULARS AND PRICE LISTS.
ADDRESS
VITRIFIED WHEEL COMPANY,
WESTFIELD MASS., U. S. A.

## SAUNDERS' PATENT
# AUTOMATIC BORING MACHINES
### FOR BUILDERS' AND FRAMERS' USE,



are universally acknowledged to be superior to all other *Boring Machines*, and we *guarantee* to give better *satisfaction* than any other machine.

*Ship Builders, House Builders, Dock Builders, Bridge Builders, Carpenters* and *Farmers* please notice what we claim for our machine, and we guarantee all that we claim: First, that it will do nearly double the work of any other machine in the same length of time, with greater ease to the operator; that we can regulate the speed of the bit according to the size of the same, or to suit the operator; it will drive the bit any required speed; it will drive the bit or auger to any required depth, and the bit or auger returns from the hole by the same automatic motion without the operator stopping the machine; at the same time clearing itself and leaving the hole entirely free from chips; it is gauged to bore such a depth as may suit the operator, boring two or more holes at exactly the same depth after being once set, without any attention from the operator; it is an angular machine and will bore on any angle; it is the most compact machine; it can be placed in so small a compass as to occupy but little room in a carpenter's tool chest, and while in this compact form it can be carriedin the hand with the greatest ease and convenience; it is the most durable machine, from the fact that we use the best material in its construction, and each part can be duplicatedin case of accident by sending directly to us. We finish the ironwork with a baked or heated Japan finish which enables it to withstand all kinds of weather, the woodwork being rubbed in oil and shellaced. They are the cheapest Boring Machines in the world for what they can do. We are introducing the Gladwin Improved Auger in connection with this machine. This auger is the best Boring Machine Auger made, being a self-clearer in gummy or knotty wood. We offer the Borer, boxed and delivered on board cars, for **$6.** with full set Gladwin Improved Augers, 18 qrs., **$9**; or with extra finished beds, **$6.50**, and full set augers, 18 qrs., **$9.50**. A discount given for large orders. Send for Descriptive Catalogue.

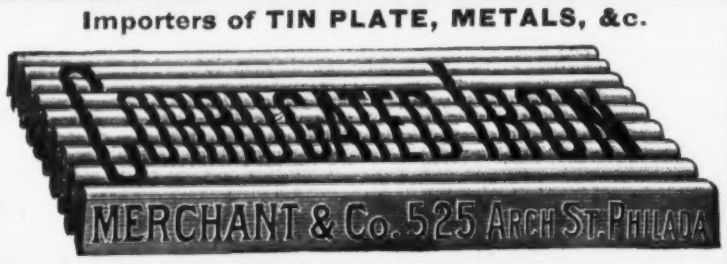
## THE W. B. WELLS MFG. CO., Ashaway, R. I.

FOR SALE BY

LOUDERBACK, GILBERT & CO., 33 Chambers St., New York.
TALLMAN & McFADDEN, 607 Market Street, Philadelphia.
BUHL, SONS & CO., Detroit, Mich.
A. W. BINGHAM & CO., Cleveland, Ohio.
GORDON HARDWARE CO., San Francisco, Cal.
HODGE & HOMER, 47 Randolph Street, Chicago Ill.

---

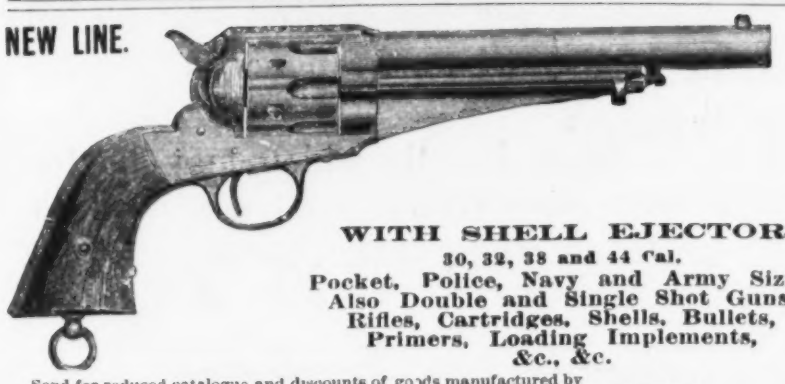
Importers of TIN PLATE, METALS, &c.




STOVE BOARDS, ZINC AND CRYSTAL,
Iron Clad Can Trimmings, Solder, &c.

---

NEW LINE.



WITH SHELL EJECTOR
30, 32, 38 and 44 Cal.
Pocket, Police, Navy and Army Sizes.
Also Double and Single Shot Guns, Rifles, Cartridges, Shells, Bullets, Primers, Loading Implements, &c., &c.

Send for reduced catalogue and discounts of goods manufactured by

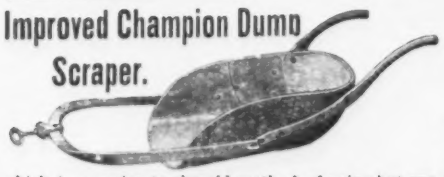
## E. REMINGTON & SONS,
283 Broadway, - - - - NEW YORK.

---

## WROUGHT IRON TACKLE BLOCKS,
Swivel Hooks for Rope or Chain,
POLISHED GROOVES, ALL SIZES IN STOCK.
Also Pulley Blocks for Wire Rope,
Headquarters for the
IRVING BRAND WOODEN PULLEY BLOCKS,
McCOY & SANDERS, Manuf'turers,
26 Warren Street, New York.

---

Improved Champion Dump Scraper.



We are the exclusive manufacturers of
**Byrket's Improved Dump and Automatic Steel Scrapers.**

We manufacture the only successful Automatic Scraper in the world. Our Dumps are the lightest and strongest scrapers made. We use two pieces of steel pressed into shape, which is superior to the old method of using but one piece, for when that breaks the whole scraper is ruined, while ours is so constructed that we can replace any part at a trifling expense. We make three sizes, to meet the wants of all classes of Earth Workers. Especially suited for Contractors and Township Road Work. Send for circulars. Manufactured by

THE CHAMPION SCRAPER CO., Troy, Ohio.

---

## CLEVELAND FLUE CLEANER MANUFACTURING CO.,

The most simple, durable and economical steam flue cleaner.

It saves from 15 to 25 per cent. in labor and fuel.

Send for Circular and Price List of Cleaner and Hose. 22 & 24 POWER BLOCK CLEVELAND O

---

## FOUNDRYMEN, ATTENTION!
FOR THE
Aiken & Drummond Patent Power Molding Machines
SEND FOR DESCRIPTIVE CIRCULAR TO
THE DRUMMOND MFG. CO., Louisville, Ky.

---

## NOVELTY IRON FOUNDRY,
## HAIGHT & CLARK,
16 & 18 DeWitt Street, ALBANY, N. Y.,
MANUFACTURERS OF FINE GRAY IRON CASTINGS
OF EVERY DESCRIPTION.
Rosettes and Pickets for Wire Workers, Castings for Furniture and Piano Manufacturers. Iron and Metal Patterns of all kinds a specialty. Correspondence solicited.
JAPANNING. BRONZING.

---

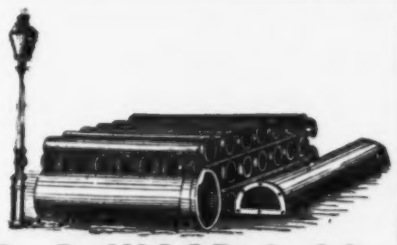
## GEO. B. CARPENTER & CO
DEALERS IN
# SUPPLIES
FOR ROLLING MILLS
MANUFACTORIES
MINING
COMPANIES
& RAILWAYS
WESTERN AGENTS FOR
## H. W. JOHNS'
ASBESTOS
LIQUID PAINTS
STEAM PACKING, MILL BOARDS
ROOFING, BOILER COVERING
GASKETS, FIRE PROOF COATINGS
CEMENTS & C.
SEND FOR CIRCULARS
202 & 208 S. WATER ST. CHICAGO.
MENTION THIS PAPER

---

AGENTS IN ALL FOREIGN COUNTRIES.

## HOWSONS PATENT OFFICES
119 South Fourth Street,
PHILADELPHIA
Branch Office, 605 Seventh St. Washington, D. C.
H. HOWSON, Engineer and Solicitor of Patents.
C. HOWSON, Attorney at Law and Counsel in Patent Cases.
SEND FOR CIRCULARS.

---



## R. D. WOOD & CO.,
Philadelphia,
Manufacturers of
**Cast Iron Pipe**
FOR WATER AND GAS,
Lamp Posts, Valves, &c.,
Mathew's Pat. Anti-Freezing Hydrants.
400 CHESTNUT STREET.

---

THE LITTLE GIANT

Wagon Tire Upsetter.
The Cheapest and Best.
LITTLE GIANT MFG CO.,
Send for Circular. Millport, N. Y.

---

## ECLIPSE ELECTROTYPE AND ENGRAVING CO.
147 ST. CLAIR ST.
CHAS. W. DEAN. CLEVELAND, OHIO.

---

ICE CREAM FREEZERS,
TORREY'S PATENT,
S. ROEBUCK & CO.,
Manufacturers,
164 FULTON ST.,
NEW YORK.

---

MACHINERY FOR
Straightening and Cutting Wire
Of all Sizes to any Length.
Send for Catalogue.
JOHN ADT,
*New Haven, Conn., U. S. A.*

---

## Prouty's Patent
# PEERLESS FORCE PUMP.
Has Self-Adjustable Foot Rest.

NEW AUTOMATIC COMPENSATING PACKING.

It will throw a continuous jet FROM FORTY TO SIXTY FEET. A new pattern jet and spray nozzle is sent with each pump.

Especial attention is called to the material and workmanship exhibited in these pumps.

LIST PRICE, $8.

THE NEW ENGLAND BUTT CO.
PROVIDENCE, R. I.
NEW YORK OFFICE, 99 Chambers St.

---

## THE AMERICAN BOLT AND SCREW CASE CO.,
DAYTON, - - - OHIO.
MANUFACTURERS OF
# REVOLVING BOLT AND SCREW CASES.

We are the only manufacturers of Bolt cases and the only parties who make lists of Bolt or Screw Cases to suit stock of purchaser without extra charge. All goods guaranteed. Send for Illustrated Circular.

PRINCIPAL AGENTS.

Markley, Alling & Co., Chicago; Ducharme, Fletcher & Co., Detroit, Mich.; Burger & Baumgard, New York City; Lloyd, Supplee & Walton, Philadelphia, Pa.; Buehler, Bombright & Co., Philadelphia, Pa.; Samuel C. B. Cook & Co., Baltimore, Md.; Bindley Hardware Co., Pittsburgh, Pa.; A. F. Shapleigh & Cantwell Hardware Co., St. Louis, Mo.; Farwell, Ozmun & Jackson, St. Paul, Minn.; Howell, Gano & Co., Cincinnati, O.; Pappenheimer Hardware Co., Cincinnati, O.; Hall & Willies Hardware Co., Kansas City, Mo.; Pratt & Co. Buffalo, N. Y.; Seeberger, Breakey & Co., Chicago, Ill.; H. C. Stratton, Boston, Mass.; Shulz & Hosen, St. Joseph, Mo.; Wyeth Hardware Co., St. Joseph, Mo.; A. Baldwin & Co., New Orleans, La.; Gorden Hardware Co., San Francisco, Cal.; Kilbourn, Jones & Co., Columbus, O.; Morley Bros., East Saginaw, Mich.; W. B. Belknap & Co., Louisville, Ky.

We are also extensive manufacturers of **Fruit Can Sealing Wax.** Send for Circulars and Prices.

Very Respectfully,
THE AMERICAN BOLT & SCREW CASE CO.

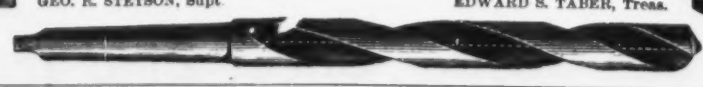
---

## MORSE TWIST DRILL AND MACHINE CO.
NEW BEDFORD, MASS., Sole Manufacturers of
Morse Patent Straight-Lip Increase Twist Drill,
Beach's Patent Self-Centering Chuck, Solid and Shell Reamers,
BIT STOCK DRILLS,

DRILLS FOR COES, WORCESTER, HUNTER AND OTHER HAND DRILL PRESSES. BEACH'S PATENT SELF-CENTERING CHUCKS, CENTER AND ADJUSTABLE DRILL CHUCKS, SOLID AND SHELL REAMERS DRILL GRINDING MACHINES. TAPER REAMERS, MILLING CUTTERS AND SPECIAL TOOLS TO ORDER.

**All Tools exact to Whitworth Standard Gauges.**

GEO. R. STETSON, Supt. EDWARD S. TABER, Treas.



---

## BEECHER & PECK
Successors to Milo Peck, Manufacturers of

PECK'S DROP PRESS

**PECK'S DROP LIFTER** is the only one which has its parts cushioned. Being thus cushioned they are the most durable Lifter in the market.

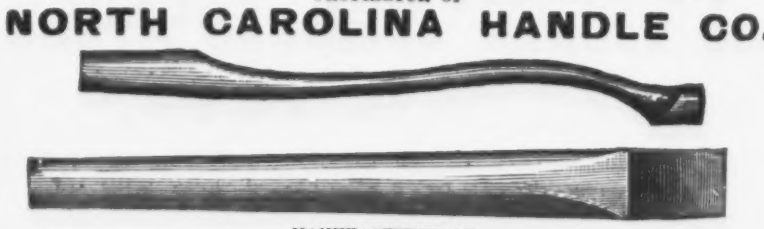
Can be attached to any drop now in use.

Send for Illustrated Catalogue.

Cor. Lloyd and River Sts. **New Haven, Conn.**

---

## V. G. HUNDLEY,
PROPRIETOR OF
NORTH CAROLINA HANDLE CO.

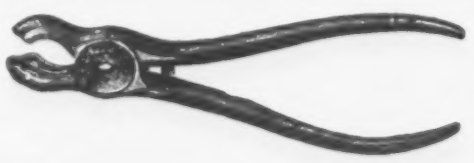


MANUFACTURER OF
**Handles and Spokes,**
79 Reade Street and 97 Chambers Street, - - - - NEW YORK.
HARDWARE COMMISSION MERCHANT.

---

## BLAIR'S PATENT BOSS HOG AND PIG RINGER.
Will close almost all kinds wire rings. The most economical to buy, to sell and to use.

Fruit Jar Caps and Wires, ¼ gross in box; price, per gross, 65 cents.



MANUFACTURED BY
**E. BLAIR, Bucyrus, Ohio.**

## PHILADELPHIA.

*Corrected Weekly by Lloyd, Supplee & Walton.*

Terms, 30 days. For 60 or 90 days, interest added at 10% per cent. per annum.

**Anvils.**
Peter Wrights. ₱ lb ..... 11 @ 11¼c
Over 200 lbs ..... 11¼c
Trenton ..... 10½c
Eagle Anvils, American, 10c ..... dis 20 %

**Apple Parers.**
Globe Apple Pearers ..... $5.50 net
Penn Apple Parers ..... $4.50 net
Lots of 10 to 24 dozen special prices

**Axes.**
Hunt's Kentucky and Yankee, per doz ..... $8.50 @ 9.00
Robert Mann ..... " $8.00 @ 8.50
Richland Chief ..... " $7.50 @ 8.00
Beveled Axes ..... " add 50c net
Double Bit Axes ..... net " $14.50 @ 15.50

**Augers and Auger Bits.**—New List January 7, 1880.
Bates' Nut Augers ..... dis 5c@55 %
Cook's Augers ..... dis 40&10 %
Watrous' Ship Augers ..... dis 1c %
Benjamin Pierce Auger Bits ..... dis 40 %
Griswold Auger Bits ..... " dis 50c@55 %
Cook's " ..... dis 40&10 %
Jennings' " ..... dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $48 ₱ doz ..... dis 25&10 %
Stearns' Pat. Hol. Augers, list $48 ₱ doz ..... dis 20&10 %

**Balances.**
Light and Common ..... dis 33⅓ %

**Bells.**
Bevin Bros. Mfg. Co. Light Hand Bells ..... dis 70 %
Swiss Pattern Hand Bells ..... 60 %
Connell's Door Bells ..... dis 15&10
Gt. Western & Kentucky Cow new list ..... dis 60

**Boring Machines**
Upright, without Augers ..... List 5.50 } dis 45@50 %
Angular, without Augers ..... " 5.75 }

**Belts.**—Eastern Carriage Bolts ..... dis 80&10 %
Philadelphia " ..... new list dis 70&10 %
Stanley, Wrought Shutter ..... dis 50&10 %

**Braces.**—Barber's ..... dis 40&5 %
Backus ..... dis 50 %
Spofford ..... dis 50&5 %
American Ball ..... dis 55 %

**Butts.**—Cast Fast Joint, Narrow ..... dis 45%10&10 %
" " Broad ..... dis 45&10&10 %
Cast Loose Joint, Narrow ..... dis 55&10&10 %
" " Broad ..... dis 55&10&10c %
" Acorn. Loose Pin ..... dis 50&10%10 %
" " " Jap'd ..... dis 60&10&10 %
" Mayer's Loose Joint ..... dis 60%10&10 %
Wrought Loose Pin ..... dis 55%10 %
" Table Hinges and Back Flaps ..... dis 50&10 %
" Narrow. Fast ..... dis 50&10 %
" Loose Joint ..... dis 55%10 %

**Blind Butts.**
Parker ..... dis 70&2 %
Clark ..... dis 70&2 %
Shepard ..... dis 70 %
Lull & Porter ..... dis 75&10 %
Huffer's ..... dis 50 %

**Chains.**—German Halter and Coil. list December 31 1881 ..... dis 50@55 %
Galvanized Pump ..... ₱ lb 9½c net
Best Proof Coil Chain—English.

| ₱ lb. | 5-16 | 3-8 | ½ | 5-16 | ¾ | 7-16 | ½ in. |
|---|---|---|---|---|---|---|---|
| | 13 | 8¼ | 6¼ | 5 | 5¾ | | gold. |

**Chisels.**—Socket Framing ..... dis 60&10 %
Socket Firmer ..... dis 60&10 %
Butcher's ..... $4.00@$5.25 to £ gold

**Casters.**—Bed (new list July 1, 1880) ..... dis 45@50 %
Plate ..... dis 45@50 %

**Coffee Mills.**—Box and Side, new list Jan. 1, 1880 ..... dis 50 %
Enterprise ..... dis 25 %

**Cutlery.**—Walden Pocket ..... new list net
Penna. Knife Co ..... new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

**Drawing Knives.**
Hart Mfg. Co.'s ..... dis 60&10 %
Adjustable Handle ..... dis 20 %

**Fry Pans.**
Tinned ..... dis 45 %

| ₱ doz. | $3.50 | 4.00 | 4.50 | 5.00 | 5.50 | 6.50 | 7.50 | 9.00 | 10.00 |
|---|---|---|---|---|---|---|---|---|---|
| No. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | | 8 |

Burnished ..... dis 60, 10 & 5 %

| ₱ doz. | $3.00 | 3.75 | 4.25 | 4.75 | 5.25 | 6.00 | 7.00 | 8.00 | 9.00 |
|---|---|---|---|---|---|---|---|---|---|
| Fo. | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

**Files.**
Nicholson ..... dis 40 %
Disston ..... dis 45 %
Butcher
**Fluting Machines.**
Eagle—3½ in. roll ..... each, $2.15 } dis 35 %
" —5½ in. roll ..... " 2.85 }
Crown—4½ in. roll ..... " 3.50 } dis 35 %
" —6 in. roll ..... " 4.00 }
" —8 in. roll ..... " 6.50 }
Geneva Fluter ..... dis 25 %
Favorite com. Fluter & Sad Iron ..... ₱ doz $10.50 net

**Hammers.**
Yerkes & Plumb's, new list ..... dis 30 %
Maydole Hammers ..... dis 15 %
Howell A. E. Nail Hammers ..... per doz. net $3.75

**Handles.**
Disston Loop Handles Crosscut ..... 33c pair net
Boynton Loop Handles Crosscut ..... 33c pair net

**Hatchets.**
Yerkes & Plumb, new list ..... dis 30 %
Hunt ..... dis 25 %

**Hinges.**
Strap and T ..... dis 60&10&10 %

**Horse Nails.**

| | Nos. | 5 | 6 | 7 | 8 | 9 | 10 | |
|---|---|---|---|---|---|---|---|---|
| Globe | | 24 | 21 | 19 | 18 | 17 | 16 | dis 12½ % |
| Vulcan | | 26 | 23 | 21 | 20 | 19 | 18 | dis 12½ % |
| Ausable | | 30 | 27 | 25 | 24 | 23 | 22 | dis 30&10 % |
| " Polished and P't'd & Blued & P't'd | | 31 | 28 | 26 | 25 | 24 | 23 | dis 30&10% |
| Clinton | | 23 | 21 | 20 | 19 | 18 | dis | 40&10% |
| " Polished & Pointed | | 24 | 22 | 21 | 20 | 19 | dis | 30&10% |

**Hay and Straw Knives.**
Lightning ..... per doz, net $18.00
Electric ..... " " 18.00
Wadsworth ..... " " 10.50
Walton Straw Knives ..... " " 17.00

**Locks and Knobs.**
Branford ..... new list dis 50&2 % cash
Gaylord Cabinet ..... dis 40 %
American Padlocks ..... dis 30, 10&2 % cash
Scandinavian Padlocks ..... dis 50 %

| ₱ doz. | $5.00 | 5.50 | 6.50 | 7.50 | 8.50 | 10.00 | 12.50 | } dis 60 % |
|---|---|---|---|---|---|---|---|---|
| No. | 57 | 58 | 59 | 60 | 61 | 62 | 63 | |

| ₱ doz. | $18.00 | 36.00 | 33.00 | } dis 60 % |
|---|---|---|---|---|
| No. | 64 | 65 | 66 | |

**Lanterns.**
Buckeye ..... Large list net; small list net
Tubular ..... No. 0, $7.50; No. 1, $9.00 ₱ doz net
Guards, 40cents extra.

**Lawn Mowers.**—Pennsylvania ..... } new list
Philadelphia ..... } dis 30 %
Excelsior. ..... }

**Lawn and Garden Pumps.**
Holland Patent ..... List $4.00 dis 10 %

**Matlocks.**
Long and Short Cutter ..... new list ..... 50 %
Pennsylvania Pattern ..... dis 50 %

**Molasses Gates.**
Enterprise Mfg Co.'s Measuring Faucets ..... dis 5 %
Stebbins' Gates ..... dis 70&10%
Lincoln's " ..... dis 60&10 %
Landers, Frary & Clark's Petroleum ..... dis 20&10 %
Brass Liquor Cocks, new list Jan. 1 1880 ..... dis 45 %
Cork Lined " ..... dis 70 %

**Meat Cutters.**
Dixon's ..... dis 25&5 %
Woodruff ..... dis 25&5 %
Stowe ..... dis 25&5 %
Hale's ..... new list, dis 50, 10&2 cash
American ..... dis 20&10 %
Stuffers ..... dis 25&5 %
Enterprise Stuffers ..... dis 25 %

**Planes.**—Sandusky Tool Co ..... dis 20 %
Ogontz ..... dis 25 %
Ohio & Auburn ..... dis 20 %
Bailey (S. R. & L. Co.) ..... dis 20&10 %

**Plane Irons.**—Ohio Tool Co ..... dis 20&10 %
Butcher's ..... $4.00@$5.25 to £

**Plumbs and Levels.**
Stanley's Adjustable ..... dis 65&10 %
" Non-Adjustable ..... dis 65&10 %

**Picks.**—New list ..... 50 %

**Razor Strops.**
Lamont Combination ..... per lot, $4.00
" ..... 1 gross lots $42.00
Imitation Emerson ..... per doz. 2.00

**Rules.**—Stanley Boxwood ..... dis 70 %10 %
Stanley Ivory ..... dis 55&10 %

**Steelyards.**—Hart's Pattern ..... dis 40&10 %

| ₱ doz. | $12.50 | 17.75 | 21 00 | 26.50 | 31 00 | 36.50 |
|---|---|---|---|---|---|---|
| Lbs | 50 | 100 | 150 | 200 | 250 | 300 |

American Pattern ..... dis 40&10 %

| ₱ doz. | $8.00 | 10.25 | 13.75 | 15.50 | 19.75 | 19.50 |
|---|---|---|---|---|---|---|
| Lbs | 50 | 100 | 150 | 200 | 250 | 300 |

**Squares.**
Steel and Iron ..... dis 50 ; full case. dis 50&10&2 for cash
Try squares, Stanley ..... dis 50&10 %
Disston's Try Squares ..... dis 40 %

**Scythes.**—Golden Clipper, Damascus Blade, Boxed and Sharpened ..... ₱ doz $9.00
Clipper No. 10, Bronzed Blade, Boxed and Sharpened ..... ₱ doz $8.50 } 30
Clipper No. 5, Painted Red, Boxed and Sharpened ..... ₱ doz $8.00 }

**Saws.**—Disston's Hand, Panel and Rip ..... dis 20 %
Disston's Circular ..... dis 40 %
Cross-Cut No. 2, Plain Tooth ..... dis 40%
" Patent Tooth ..... dis 40%
" Champion Tooth ..... dis 40%
Boynton's Lightning Cross Cut, new list ..... dis 40 %
" Lightning Buck Saws, cross bar ..... dis 40 %

**Shovels and Spades.**
Oliver Ames & Sons, new list ..... dis 15 %
Griffiths ..... dis 50@50&5
Rowland ..... dis 50@50&5

**Sad Irons.**—4 to 10 lbs ..... ₱ lb 5½
Mrs. Potts' Patent ..... ₱ lb 5½@
..... dis 35 %

**Stone.**
Washita Extra ..... ₱ lb 23½
" No. 1 ..... " 18c
" No. 2 ..... " 16c
" Slips ..... " 37c
" Axe ..... " 130 net
Hindostan Oil Stone No. 1 ..... ₱ lb 8c } dis 33½ %
" Axe Stone ..... " 8c }
" Slips ..... " 100 }

**Screws.**
Flat Head Iron, new list Dec. 27 ..... dis 45 %
Flat Head Brass, new list Dec. 27 ..... dis 55 %
Round Head Brass, new list Dec. 27 ..... dis. 40 & 10 %
Round Head Iron, new list Dec. 27 ..... dis. 45 & 10 %

**Spoons.**
Plated ..... dis 40&10&5 %
German Silver ..... dis 30&10&5 %
Britannia, Boardman's ..... dis 60&10 %
" Parker's ..... dis 60&10 %

**Tinned** ..... dis 10 %

**Springs.**—Torrey ..... dis 50 %
Gem No. 3 small Jap'd ..... $2.00 } dis 50 & 10 %
" No. 2 medium Jap'd ..... 2.75 }
Coil No. 0, per gross net ..... $6.00
Other Standard Springs ..... dis 60&10 %
Warner Door Springs, per doz. net ..... 1.75
Standard Spring Hinges—
Single No. 0, per doz. net ..... 1.25
" No. 1, " " ..... 1.40
Other Standard Spring Hinges ..... dis 25&10 %

**Stocks and Dies.** ..... dis 10&5 %

**Stove Polish.**—Gem ..... ₱ gross, $4.50, dis 5 %
Dixon ..... 6.00, dis 10%
Fire Fly ..... $3.00 gross net

**Tacks.** ..... dis 30&10 %
Shoe Nails—4-8, and over 8c ..... } 10 %
" " 3½-8, and under 9c ..... }
Double Pointed Tacks ..... dis 40&5 %

**Traps.**
Genuine Oneida—Newhouse ..... dis 35 %
Im. Oneida—Newhouse list, first qual ..... dis 55&5&@ 60 %

**Vises.**—Solid Box Trenton new list ..... dis 35 %

**Wrenches.**—Agricultural ..... dis 70 %
Coes' Genuine ..... dis. 50&3 %
Coes' Mechanics' ..... dis. 50&10&3 %
" " Mall. Bar ..... dis 75 %

**Wire.**
Bright or Ann'd, No. 0 to 18 ..... dis 57½@60 %
" No 19 to 26 ..... dis 60@65 %
" " No. 27 to 36 ..... dis 62½@70 %
Coppered, 0 to 18 ..... dis 50@50½ %
Tinned Broom Wire ..... dis 57½@60 %
Galvanized Barb Wire ..... 7¼c
Painted Barb Wire ..... 6¼c
Galvanized No. 7 to 18 ... Market List, dis 45@47½ %

**Wringers.**
Peerless No. 2½ ..... $42.00
" No. 2 ..... 45.00
Universal No. 2½ ..... 43.00
" No. 2 ..... 45.00
Novelty No. 2, for common tubs ..... 42 00
" No. 3, " " ..... 48.00
Excelsior E, for stationary tubs ..... 51.00
" F " " ..... 57 00
In lots of 1 doz. $3.00 doz. dis. from above price.

## PITTSBURGH.

**Merchant Iron.**

TERMS.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

**For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.**

The following are card rates.

*Flat Bar.*
1½ to 4 by ⅛ to 1 inch ..... 2.50
1¼ to 6 by ⅛ to 1 " ..... 2.60
1¼ to 6 by 1¼ to 1¾ " ..... 2.90
1¼ and 1¾ by ⅛ to ¾ " ..... 2.80
1 and 1¼ by ¼ to ¾ " ..... 2.70
⅝, ¾ and ⅞ by ⅛ to ⅝ inch ..... 2.90

*Rounds and Squares.*

| | | | |
|---|---|---|---|
| 1 to 1⅜ | 2.50 | ⅜ to 9-16 | 2.70 |
| 2 to 2⅝ | 2.70 | ⅝ to 7-16 | 2.90 |
| 2¾ to 3¼ | 3.00 | ⅝ | 3.10 |
| 3¼ to 4 | 3.50 | 7-16 | 3.30 |
| 4¼ to 5 | 4.00 | ¼ | 3.50 |
| ¼ to ⅜ | 2.50 | 9-16 | 4.50 |

*Oval Iron.*
⅛ to 1¼ ..... 2.90 | ⅛ ..... 3.30
⅛ to ¾ ..... 3.10 | ¾ ..... 3.70

*Half Oval and Half Round.*
⅛ to 1¼ inch ..... 3.20 | ⅛ inch ..... 4.00
⅛ to ¾ " ..... 3.70 | ¾ " ..... 5.50

*Horse Shoe.*
⅛ to 1¼ by 5-16 to ¾ inch ..... 3.50

*Wagon Box Iron.*
¼ Inch, Nos. 13 and 14 ..... 3.70
⅜ " " 11 and 12 ..... 3.40
⅜ " " 13 and 14 ..... 4.00
½ " " 11 and 12 ..... 3.80
½ " " 13 and 14 ..... 4.40
⅝ " " 11 and 12 ..... 4.10

*Heavy Bands.*
1¼ to 6 by ¼ and 5-16 inch ..... 2.70
1¼ to 3¼ by ¼ and 5-16 " ..... 2.70
1 to 1¾ by ¼ and 5-16 " ..... 2.80
⅛ to ⅞ by ¼ and 5-16 " ..... 3.00
⅝ and ⅜ by ¼ and 5-16 " ..... 3.50

*Light Bands.*
1¼ to 6 by ⅛ to 3-16 ..... 3.00
1¼ to 6 by Nos. 11 and 12 ..... 3 10
1 to 1¾ by ⅛ to 3-16 ..... 3.10
1 to 1¾ by Nos. 11 and 12 ..... 3.20
⅞ and 1 3-16 by ⅛ to 3-16 ..... 3.40
⅞ and 13-16 by Nos. 11 and 12 ..... 3.50
⅝ and 11-16 by ⅛ to 3-16 ..... 3.70
⅝ and 11-16 by Nos. 11 and 12 ..... 3.80
⅝ and 9-16 by ⅛ to 3 16 ..... 4.00
⅝ and 9-16 by Nos. 11and 12 ..... 4.10
½ inch by ⅛ and 3-16 ..... 4.30
½ inch by Nos 11 and 12 ..... 4.40

*Hoop Iron.*
1¼ to 4, Nos. 13, 14 and 15 ..... 3.30
1¼ to 2, Nos. 16, 17 and 18 ..... 3.40
1¼ to2, No. 19 ..... 3.50
1¼ to 2, No. 20 ..... 3.60
1¼ to 2, No. 21 ..... 3.70
1¼ to 2, No. 22 ..... 3.80
15-16 1, and 1¼, Nos. 13, 14 and 15 ..... 3.40
15-16. 1, and 1¼, Nos. 16, 17 and 18 ..... 3.60
15-16. 1, and 1¼, Nos. 19 and 20 ..... 3.70
15-16. 1, and 1¼, No. 21 ..... 3.80
15-16. 1, and 1¼, No. 22 ..... 4.00
⅞, Nos. 13, 14 and 15 ..... 3.70
⅞, Nos. 16, 17 and 18 ..... 3.80
⅞, Nos. 19 and 20 ..... 3.90
⅞, No. 21 ..... 4.00
⅞, No. 22 ..... 4.10
13-16, Nos. 13, 14 and 15 ..... 3.90
13-16, Nos. 16, 17 and 18 ..... 4.00
13-16, Nos. 19 and 20 ..... 4.10
13-16, No. 21 ..... 4.20
13-16, No. 22 ..... 4.30
¾, Nos. 13, 14 and 15 ..... 4.00
¾, Nos. 16, 17 and 18 ..... 4.10
¾, Nos. 19 and 20 ..... 4.20
¾, No. 21 ..... 4.30
¾, No. 22 ..... 4.40
11-16, Nos. 13, 14 and 15 ..... 4.20
11-16, Nos. 16, 17 and 18 ..... 4.30
11-16, Nos. 19 and 20 ..... 4.40
11-16, No. 21 ..... 4.50
11-16, No. 22 ..... 4.60
⅝, Nos. 13, 14 and 15 ..... 4.40
⅝, Nos. 16, 17 and 18 ..... 4.50
⅝, Nos. 19 and 20 ..... 4.60
⅝, No. 21 ..... 4.70
⅝, No. 22 ..... 4.80
⅝, No. 23 ..... 4.90
9-16, Nos. 13, 14 and 15 ..... 4.60
9-16, Nos. 16, 17 and 18 ..... 4.70
9-16, Nos. 19 and 20 ..... 4.80
9-16, No. 21 ..... 4.90
9 16, No. 22 ..... 5.00
9-16, No. 23 ..... 5.10
⅜ inch, Nos. 13, 14 and 15 ..... 4.80
⅜ " Nos. 16, 17 and 18 ..... 4.90
⅜ " Nos. 19 and 20 ..... 5.10
⅜ " No. 21 ..... 5.20
⅜ " No. 22 ..... 5.30
⅜ " No. 23 ..... 5.40

The prices under Hoop Iron do not apply to Cotton Ties.

1-10c per lb. extra will be charged for each gauge lighter than the lightest indicated.

1-10c per lb. extra will be charged for cutting Hoops to specified lengths.

*Barrel Hoops.*
1¼ to 2 in., cut to length.
9 to 11 lbs, per set of 6 hoops ..... 3.50
8 lbs. and less than 9 lbs. per set of 6 hoops ..... 3.60
Less than lbs. per set of 6 hoops ..... 3.80
*Extras for Cutting to Length all Preceding Iron.*
All Iron, including Tire ..... 1.100

*Tank Iron.*
No. 9 and heavier ..... 3.30
Plow Slabs ..... 3.50
" Wings ..... 3.80

*Sheet Iron.*

| | Common. | Charcoal. | Juniata. |
|---|---|---|---|
| No. 10 to 14 | 3.50 | 4.00 | 4.10 |
| No. 15 to 17 | 3.80 | 4.30 | 4.80 |
| No. 18 to 21 | 4.10 | 4.80 | 7.10 |
| No. 22 to 24 | 4.30 | 5.80 | 7.30 |
| No. 25 & 26 | 4.50 | 6.00 | 7.50 |
| No. 27 | 4.70 | 6.20 | 7.70 |
| No. 28 | 5.10 | 6.50 | 8.10 |

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10c extra.

*Wood's Patent Planished Sheet.*
1st quality (A) ..... 10½c | 2d quality (B) ..... 9 c
*Galvanized C. H. B.*—(Charcoal Hammered Blooms.

| | | | |
|---|---|---|---|
| Nos. 14 to 20 | 12c | No. 27 | 15c |
| Nos. 21 to 24 | 13c | No. 28 | 16c |
| Nos. 25 and 26 | 14c | No. 29 | 18c |

45 @ 47½ % discount.

*Coal Screen Iron.*
1¼ by ⅝ by 6-16 ..... 3.00 | 1 by ¾ by 6 16 ..... 3.50

*Angle Iron.*
2½, 3, 3½ and 4 inch ..... 3.30
1½, 1¾ 2 and 2½ inch ..... 3.30
1¼ inch ..... 3.40
1 " ..... 3.50
1¼ by 1 inch, for Plow Handles ..... 3.80
1½ by ¾ " " " ..... 3.80
1⅝ by ⅝ " " " ..... 3.90

*T Rail.*

| | | | |
|---|---|---|---|
| 8 lbs. to the yard | 2.90 | 20 lbs. to the yard | 2.80 |
| 12 " " | 2.80 | 28 " " | 2.80 |
| 16 " " | 2.80 | 30 " " | 2.80 |

Splice Joints for 12, 16 and 20-lb. Rail, 40c each ; 28 and 30 lb. Rail, 50c each ; 40 lb., 60c each.
3½ by ⅜ and ⅛ Spikes for 20 and 28-lb. Rail ..... 3½c
2½ and 3 by ⅜ " " 12 and 16-lb. " ..... 4c
2½ by 5 16 " " 8 lb. Rail ..... 4½c

*Flat Rails.*—Punched and Countersunk.
1½ to 2 by ⅛ to ⅝ inch ..... 3.00
1½ by ⅜ and 7-16 inch ..... 3.20
1¼ by ⅝, 7-16 and ½ inch ..... 3.50

Juniata Nail Rods ..... 6.50
Norway " ..... 8.00
Guard Iron ¾x⅛x2⅝ and ¾x⅜x2⅝ ..... 4.00
" ¾x⅝x2 7-16 and ¾x⅝x1½ ..... 4.20
Drag Bars ..... 3.90
Dropper Bars ..... 3.80
Cylinder and Landside Iron ..... 3.20
Plow Beam Iron ..... 3.00

**Nails.**
See Pittsburgh Trade Report.

**Best Quality Refined Cast Steel.**
*Square, Flat, Octagon and Round.*
⅜ to 2 inches, inclusive ..... 10½c
1-16 and 2⅛ to 3 inches ..... 11½c
¼ and 3⅛ to 4 " ..... 12½c
7-32 and 4⅛ to 5 " ..... 13½c
3-16 and 5⅛ to 6 " ..... 16c
5-32 inch ..... 21c
⅛ inch ..... 30c
Oil Well Steel Forgings ..... 20c

*Machinery Steel.*

| | Crucible. | Bessemer & Open Hearth |
|---|---|---|
| Ordinary Sizes, ⅜ to 2 inch | | |
| Round | 6c | 5c |
| 5-16 and 2⅛ to 3 inches | 7c | 6c |
| ¼ and 3⅛ to 6 " | 8c | 7c |
| 7-32 inch | 10c | 8c |
| 3-16 " | 12c | 10c |

Square, Flat and Octagon, ½c extra throughout the list.
Cut to specified lengths, ½c extra.

*Hammer Cast Steel.*
Crucible Cast Steel ..... 7c
Open Hearth Cast Steel ..... 6c

*Sheet Steel.—Crucible.*

| | Best. | 2d Qual. | 3d Qual. | Bessemer & Open Hearth. |
|---|---|---|---|---|
| To 21 gauge | 12c | 11c | 9c | 7c |

1c. extra for each additional gauge.
Cut to multiples or specified lengths, ½c. extra.

*Miscellaneous Cast Steel.*
Auger and Auger Bit ..... 7c
Axle Steel for carriages and wagons ..... 7c
Frog Points and Plates ..... 7c
" Side Bars ..... 6c
Pick, plain (hammered) ..... 8c
" and Mattock, beveled (rolled) ..... 7c
Skate Steel ..... 7c
Table Cutlery, plain ..... 6c
Table Cutlery, beveled ..... 6½c
Pike and Cant Hook ..... 8c
Coal and Granite Wedge ..... 8c
Roller ..... 8c
Spindle, subject to Machinery classification ..... 8c
Tram Spring Steel ..... 9c
Forged Crank Pins and Lathe Spindles ..... 9c
Piston Rods, plain ..... 7c
" forged to shapes ..... 9c
Slide Bars, plain ..... 8c
" forged to shapes ..... 9c

*Crucible, Open Hearth or Bessemer.*
Boiler, Fire-Box and Flue Sheets, not less than 5 16 thick ..... 8c
Boiler, Fire-Box and Flue Sheets, not less than ⅜ thick ..... 7c
Circulars and semi-circulars, when ordered separately ..... 8c
Smoke Stack, to shape ..... 7c
Locomotive Tank Steel ..... 6c

*File Cast Steel.*
Square, Round, Half Round and Flat Bastard, 8-inch and over ..... 8c
Mill Saw, 8-inch and over ..... 8½c
Taper, 3½-inch and over ..... 9½c
Horse and Shoe Rasp ..... 8½c

*Spring Cast Steel.*
Spiral and Taper, cut to lengths ..... 6½c

*Tire Cast Steel.*
1x¼ and over ..... 8.50
1x3-16, ¾x3-16 and ¼ ..... 90
1 and 1 3-16x¼ and 5-32, ¾x3-16 and 5-32 ..... 95c
⅝ and ⅝x¼ and 3-32 and 12 g ..... 1c
Solid Safe Cast Steel ..... 7½c
Three and Five Pit Cast Steel ..... 10c

*Agricultural Implement Cast Steel*
Fork and Rake, Crucible ..... 6c
Horse Rake Steel, cut to lengths, Crucible ..... 7c
Hoe, Crucible ..... 7c
Corn Stalk Cutter, beveled ..... 6c
Beveled Hoe and Shovel Steel in Bars ..... 7½c
Crucible Plow Steel in slabs ..... 9c

*Bessemer and Open Hearth.*
Spring ..... 4½c
" spiral and taper, cut to lengths ..... 5½c
Tire, 3 -16 thick and above ..... 4½c
Toe Calk ..... 4½c
Plow ..... 4½c
Axle Billets ..... 4c
Sleigh Shoe ..... 4c
Cutter Shoe, cut to lengths and tapered ..... 5½c
Scythe Back Steel ..... 4c
Grain Drill Bars ..... 6c
" Points ..... 6c
Rolling Coulter Blanks, cut and punched ..... 7c
Thrasher Steel ..... 9½c
" Teeth ..... 4½c
Rolled Hammer Billets ..... 5½c
Rolled Hammer Billets ..... 4½c

*Terms.*—Four months : 2 per cent. discount for cash, if remitted within 30 days.

**Rolls and Castings.**
Furnace Floor and Straightening Plates ..... 1¾c
Housings and Castings not otherwise specified ..... 2¾c
Guide Plates ..... 3½c
Spindles and coupling boxes ..... 3½c
Sand Rolls and Pinions, large size ..... 3 c
" small size ..... 3½c
Pipe Mill Castings ..... 5 c
Rolling Mill Castings under 50 lbs ..... 8 c
Spur and Bevel Wheels, large ..... 4 c
" " small ..... 4½c
Pulleys up to 30 inches ..... 4½c
" over 30 inches ..... 4½c
Engine Castings, light ..... 4½c
" " heavy ..... 4 c

*Chilled Rolls.*
6 to 15 in. diam., to 20 in. long ..... 4½c
8 to 15 in. " 8 to 40 in. " ..... 4½c
25 to 24 in. " 15 to 72 in. " ..... 4c
14 to 24 in. " 72 to 108 in. " ..... 4c

After Oct. 1, 1881, no discounts will be made at settlement as heretofore, prices quoted being net.

**White and Red Lead.**
Strictly Pure White Lead in Oil, in kegs, 6½c.; in 25 ₱ Tin Pails, ¾c. ₱ ₱ over keg price; 12½ ₱ Tin Pails, 1c ₱ ₱ over keg price; assorted, 1 to 5 ₱ cans, 3c. per ₱ over keg price.
Dry White Lead in barrels ..... 6½c
Red Lead, very brilliant, in kegs, 6½c ; in barrels 6½c
Litharge (Potter's Lead) " 6½c ; 6½c

Freights equalized with all points where White Lead is made.

Terms: Note at sixty days, or if paid within 15 days from date of invoice a discount of 2½ per cent. will be allowed, but not otherwise.

**Window Glass.**
*Discount, 70 % on Single Strength, 70 & 10 % on Double.*

**Single Strength.**

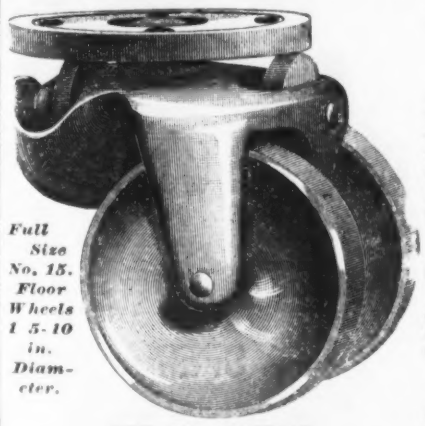
| Size. | AA. | A | B. | C. |
|---|---|---|---|---|
| 5 x 8 to 10 x 15 | $8.25 | $7.50 | $7.00 | $6.50 |
| 11 x 14 to 16 x 24 | 9.25 | 8.50 | 8.00 | 7.25 |
| 18x 22 to 20 x 30 | 10.75 | 9.75 | 8.75 | 7.75 |
| 15 x 36 to 24 x 30 | 12.25 | 10.75 | 9.00 | 8.00 |
| 26 x 28 to 24 x 36 | 13.00 | 11.50 | 9.75 | 9.00 |
| 26 x 30 to 26 x 44 | 14.50 | 13.25 | 10.75 | 9.50 |
| 26 x 46 to 30 x 50 | 15.00 | 14.00 | 11.25 | 10.50 |
| 30 x 52 to 30 x 54 | 16.00 | 14 50 | 12.00 | |
| 30 x 56 to 34 x 56 | 17.25 | 15.50 | 13.50 | |
| 34 x 58 to 34 x 60 | 18.25 | 17.25 | 15.00 | |
| 36 x 60 to 40 x 60 | 20.75 | 18.75 | 17.25 | |

Double Strength.

| | | | | |
|---|---|---|---|---|
| 6 x 8 to 10 x 15 | 12.75 | 11.75 | 10.75 | 10.00 |
| 11 x 14 to 16 x 24 | 14.50 | 13.25 | 12.50 | 11.25 |
| 18 x 22 to 20 x 30 | 17.25 | 15.75 | 14.00 | |
| 15 x 36 to 24 x 30 | 19.75 | 17.25 | 14.50 | |
| 26 x 28 to 24 x 36 | 21.00 | 18.50 | 15.75 | |
| 26 x 36 to 20 x 44 | 23.25 | 21.25 | 17.25 | |
| 26 x 46 to 30 x 50 | 24.00 | 22.50 | 18.00 | |
| 30 x 52 to 30 x 64 | 25.75 | 23.25 | 19.25 | |
| 30 x 50 to 34 x 46 | 27.75 | 25.00 | 21.75 | |
| 34 x 58 to 34 x 80 | 29.25 | 27.75 | 24.00 | |
| 36 x 60 to 40 x 80 | 33.25 | 30.00 | 27.75 | |

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 81 united inches, will be charged in the 84 united inches bracket.

**Hubbard, Bakewell & Co.'s Goods.**
Axes, Single Bit, Lippincott ..... Per doz. $8.00
" " James & Co ..... " 7.00
" Double Bit, Lippincott ..... " 14.00
" " James & Co ..... " 12.00
Drain Tools, list ..... dis 20%
Hoes, Planters' ..... dis 50%
" Scovill Pattern ..... dis 50%
" Handled, Square Eye, German ..... dis 25%
Handles, Cross Cut ..... Per doz. $3.50
" Shovel, Bent, Bored, Riveted ..... " 2.50
Saws, Circular ..... dis 45%
" Long ..... dis 40%
" Cross Cut, H. B. & Co., Champion. Per ft. net ..... $0 35
" Cross Cut, Lippincott, Champion. Per ft. net ..... .30
Shovels, list ..... dis 20%
Spades, " ..... dis 20%
Scoops, " ..... dis 20%

*Full Size No. 15. Floor Wheels 1 5-10 in. Diameter.*

SEND FOR CIRCULAR.

# YALE CASTER.

**Nine Sizes Ready.**

**Floor Wheels Ranging from 1 2-10 to 4 inches Diameter. For Furniture of all kinds, Factory Trucks, or Anything that Needs a Caster. No Wearing of Carpets. Turns Easily on Two Friction Rollers. A Perfect-Working Caster. A Gem of Art.**

AGENTS:

**Henry B. Newhall Co., New York and Boston.**
**John Duer & Sons, Baltimore.**
**H. H. & C. L. Munger, Chicago.**
**Gordon Hardware Co., San Francisco.**

MANUFACTURED BY THE

**YALE CASTER CO., New Haven, Ct.**

# THE "COLUMBUS" SOLID STEEL SCRAPER.

No. 1 carries 7 feet of earth.
No. 2 carries 5 feet of earth.
No. 3 carries 3 feet of earth

**THE PERFECT SCRAPER,**

Made from one sheet of Steel, 3-16 of an inch thick, PRESSED into shape. It is without Seam, Joint or Rivet, and is the Lightest, Strongest and most Durable Scraper made. Fills easier and cleans better than any other, and there is nothing about it to get out of repair. We also manufacture the well-known

**DOTY'S AUTOMATIC REVOLVING SCRAPERS,**

And a full line of

**WHEELBARROWS, ROAD PLOWS, &c.**

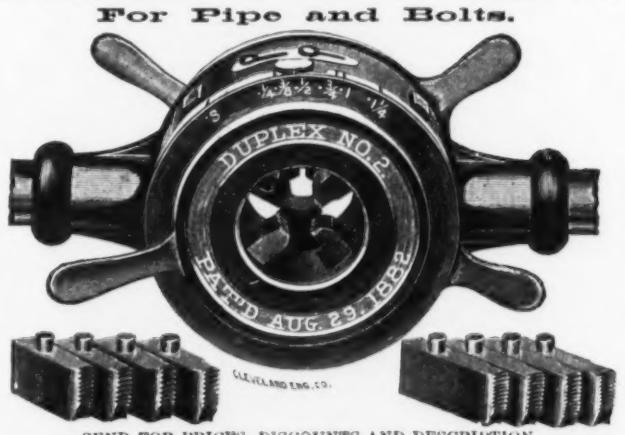
For Prices, Terms &c., address

**KILBOURNE & JACOBS MFG. CO., Columbus, Ohio, U. S. A.**

# ADJUSTABLE "DUPLEX" DIE STOCK

**For Pipe and Bolts.**

Only Die Stock with Adjustable Self-Centering Guides.




NO LOOSE PIECES.

SEND FOR PRICES, DISCOUNTS AND DESCRIPTION.

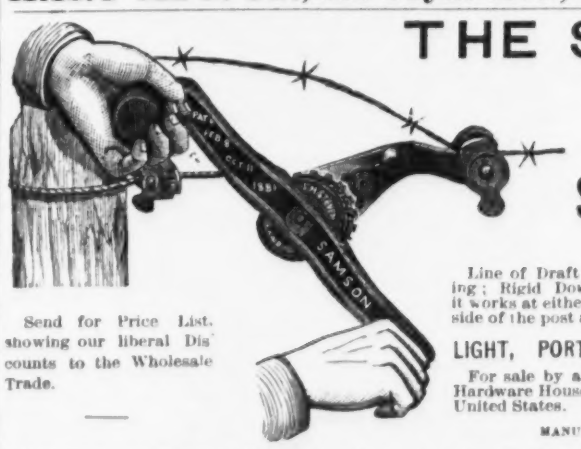
**HART MFG. CO., 990 Payne Ave., Cleveland, Ohio.**

# THE SAMSON

is the Best, the Simple and most Portable

# WIRE STRETCHER

in the Market.




Send for Price List, showing our liberal Discounts to the Wholesale Trade.

Line of Draft direct; always Self-Adjusting; Rigid Double Handle; Double Pawl; it works at either end of the fence, at either side of the post and either side up.

**LIGHT, PORTABLE, SIMPLE, SURE.**

For sale by all leading wholesale Jobbing Hardware Houses and Barb Wire men in the United States.

MANUFACTURED ONLY BY

**SAMSON NOVELTY WORKS, Nos. 14 & 16 Main St., De Kalb, Ills.**

AND IN CANADA BY

**BULLOCK HARDWARE CO., Otterville, Ontario.**

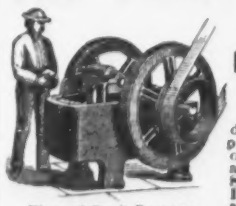
# The Farrel Foundry and Machine Co.

**ANSONIA, CONN.,**

Manufacture improved

**ROCK & ORE BREAKERS,**

(THE "BLAKE" STYLE),



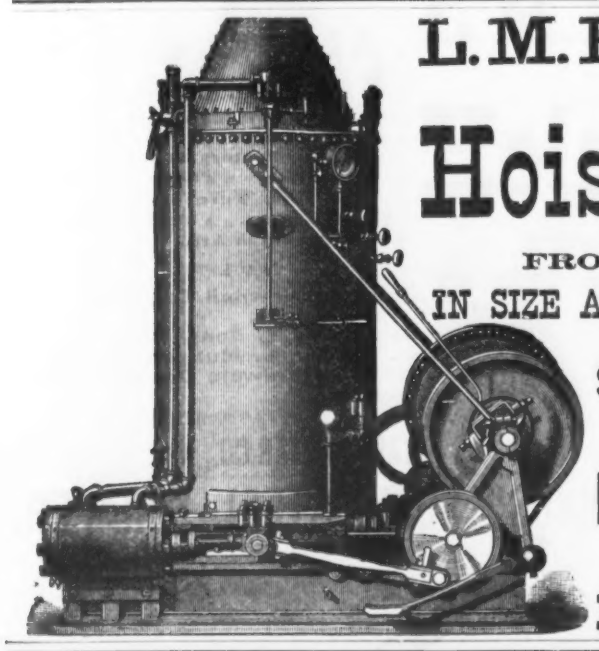
View of Rock Breaker.

designed for breaking to small pieces and one-third dust all kinds of hard and brittle substances, such as **Quartz, Emery, Gold and Silver Ores, Coal, Plaster, Iron, Copper and Lead Ores**; also, **Stone** for making **Concrete and Railroad Ballast.**

Medal of Superiority, American Institute Fair, 1881.

**Twenty years** of practical test at **Hoone** and **Abroad**, has proven this machine to be the best one ever invented for the purpose. Mr. S. L. MARSDEN, for the past fifteen years connected with the manufacture of these machines, has charge of this department of our works, and will personally superintend their erection within a reasonable circuit. **Gold Medal** awarded at the Massachusetts Mechanic Association, 1881, and **Silver Medal** (special) at American Institute, New York, 1882.

**COPELAND & BACON, General Agents, 85 Liberty St



# L. M. RUMSEY MFG. CO.

ST. LOUIS, MO.

# Hoisting Engines

FROM 4 TO 50 HORSE POWER,

IN SIZE AND STYLE TO SUIT REQUIREMENTS.

SPECIAL COAL-HOISTING ENGINES

DOUBLE-CYLINDER MINING ENGINES,

## ENGINES AND BOILERS

Pumping Machinery,

MINING AND ENGINEERS' SUPPLIES.

## AMERICAN BOLT CO., Lowell, Mass.,

MANUFACTURERS OF

Bolts, Nuts, Washers, Chain Links, Car Bolts, Bridge Bolts, Lag Screws, &c.

## HENRY B. NEWHALL CO.

105 Chambers Street AND 89 Reade Street, NEW YORK.

47 Pearl Street, COR. FRANKLIN, BOSTON, MASS.

JAMES H. WORK, Manager.

MANUFACTURERS' AGENTS FOR

Chamfered and Trimmed, Square and Hexagon

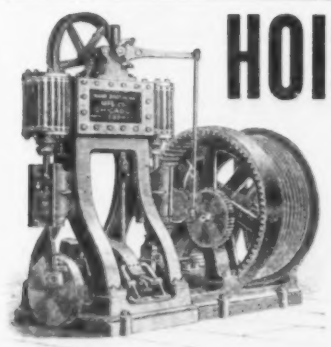
# MACHINERY NUTS.

SQUARED AND TAPPED HEXAGON NUTS,

U. S. Government Standard Threads,

WARRANTED INTERCHANGEABLE.

Turn-Buckles, Clinch Rings, Bolt Ends, Chain Links, Ship Chandlery Hardware.



## HOISTING ENGINES

FOR

Blast Furnaces, Coal and Iron Mines.

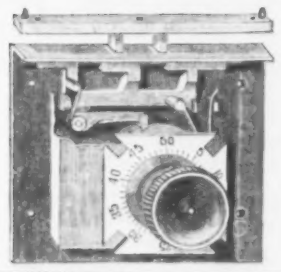
CRANE BROS.' MFG. CO.

CHICAGO WORKS:

No. 10 N. Jefferson Street.

NEW YORK OFFICE

92 & 94 Liberty Street.



TAYLOR'S DUPLEX

## COMBINATION LOCKS.

The Cheapest and Best in the World. Send for Prices.

RETAIL FROM $1.50 TO $3.00. 2500 CHANGES.

FOR ALL PURPOSES.

TAYLOR MFG. CO.,

NEW BRITAIN. CONN.

PREPARED

## HOUSE PAINTS

BILLINGS, TAYLOR & CO.,

CLEVELAND, OHIO,

Color Makers, Varnish Makers, AND PAINT MANUFACTURERS.

Send for Sample Card and Catalogue.

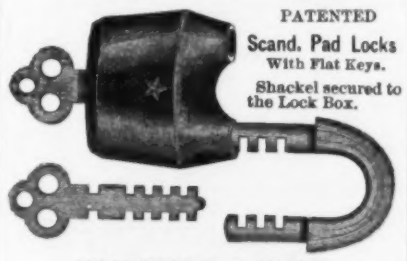
READY FOR USE. Eastern Office, 105 John St., New York City.

## STAR LOCK WORKS.

ESTABLISHED 1836.

Trunk Locks, Pad Locks, Dead Latches, Door Springs, Trunk Stays, Keys, &c,

110 South 8th St., and Sansom, bet. 8th and 9th, PHILADELPHIA.

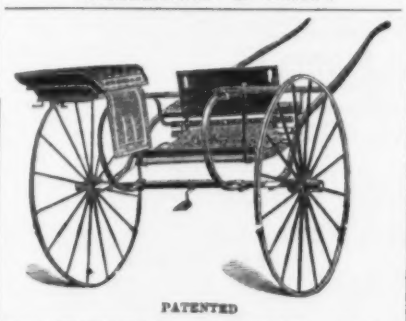


PATENTED

Scand. Pad Locks With Flat Keys.

Shackel secured to the Lock Box.

HILLEBRAND & WOLF.



PATENTED

## C-SPRING CART CO.,

RUSHVILLE, IND.

We are making a Road Cart that is strong, light, easy on the horse and rides as easy as a buggy. Easy to get in and out of. Cut shows No. 3, with seat swung back ready to enter. Write for catalogue and prices.

## GUN POWDER.

Laflin & Rand Powder Co.,

*No. 29 Murray Street, New York,*

Manufacture and sell the following celebrated brands of Sporting Powder known everywhere as

ORANGE LIGHTNING, ORANGE DUCKING, ORANGE RIFLE,

more popular than any Powder now in use.

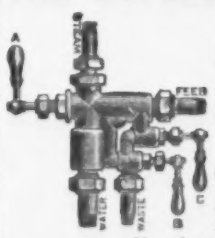
*Blasting Powder and Electrical Blasting Apparatus.*

*Military Powder* on hand and made to order.

SAFETY FUSE, FRICTIONAL & PLATINUM FUSES.

Pamphlets showing sizes of grain sent free.

## THE DUPLEX INJECTOR.



SIMPLE, RELIABLE AND DURABLE.

The constantly increasing Sales of this Injector attests its Superiority as a Boiler Feeder.

Manufactured by

JAMES JENKS,

48, 50, 52 and 54 Randolph St.,

DETROIT, MICH.

# PATENTS.

Experienced in soliciting United States and Foreign Patents prior and subsequent to service in United States Patent Office. **Personal attention** to every case from beginning to end. Practical and theoretical knowledge of the mechanic arts. Prompt and skillful prosecution of applications for **Patents, Designs, Trade-Marks** and **Labels. Expert Searches** and **Opinions** as to scope, validity and infringement. Representatives in over thirty foreign countries. Terms reasonable, and always agreed upon before any expense is incurred. Send for circular. **Ten Years' Experience.**

E. B. STOCKING,

*Attorney-at-Law,*

Opp. Patent Office, WASHINGTON, D. C.

THE FALLS RIVET CO. CUYAHOGA FALLS, O. NORWAY IRON RIVETS

MANUFACTURERS OF

## NORWAY IRON RIVETS AND BURRS,

AND ALL SIZES OF

WROUGHT IRON WASHERS.

GENERAL NEW ENGLAND AGENTS:

JOHN WALES & CO.,

239 & 241 Franklin St., - Boston, Mass.

WESTERN AGENT:

S. E. BLISS, 89 Lake St., Chicago, Ills.

This Band Saw has a 30-inch wheel, covered with rubber. Saws 12 inches wide. Both wheels are adjustable, the upper one by a thumb-screw by which the saw can be run anywhere on the wheel, the lower one by three screws at either end of frame. Both wheels run in boxes of the best babbit metal. The upper spindle is of steel, the lower of hammered iron. The slides are bolted on the frame, and the wear can be taken up. The upper end of screw has a rubber spring, which allows the saw to give at any sudden jar, and prevents the saw breaking. The frame is heavy and stiff, and weighs nearly 700 lbs. The tight and loose pulleys are 12 inches in diameter, and should make 450 revolutions per minute. We send one pair Brazing Tongs, Form, two Clamps, and Silver enough for twenty welds with every Saw.

SNIGGS & CO., 210 Terrace, Buffalo, N. Y.

## Geo. A. Boynton

BROKER IN IRON

70 WALL ST, N.Y.


## BOSTON.

*Reported by Macomber, Bigelow & Dowse.*

**Anvil & Vise.**—
No. 1, $4.25; 2, 4.25; 3, 3.50 each.....dis 25 %

**Augurs & Bitts.**—Snell's Auger.....dis 40&10 %
L'Hommedieu's Ship Auger.....dis 15 %
Jenning's Bitts.....dis 10&10&10 %
Cook's Bitts.....dis 40&10 %
Shepardson's Double-Cut Bitts.....dis 45 %
Shepardson's Double Gimlets.....dis 40 %
Stearn's Extension Hollow Augers—
No. 2, ₱ doz., $48.00; No. 3, ₱ doz., $60.00 list..dis 20 %
Bonney's Extension Hollow Augers.....₱ doz $36.00
Pierce's Bitts.....dis 50 %
Griswold Bitts.....dis 50 %

**Axes.**—Blue Jackets.....₱ doz $9.00
Red Cross.....₱ doz 8.00
Red Cross Handled.....₱ doz 12.00
Dowse Handled Boys'.....dis 33⅓ %

**Ax Handles.**—
Oak Extra, 31 in., No. A.....₱ doz $2.50
Oak Extra, 34 in., No. A.....₱ doz 2.50
Oak Extra, 31 in., No. B.....₱ doz 2.00
Oak Extra, 34 in., No. B.....₱ doz 2.00
Oak Extra, 31 or 34 in., No. C.....₱ doz 1.50

**Axle Clips**.....dis 50 %
**Balances.**—Chatillon's.....dis 33⅓ %

**Barn Door Rail.**—
Cast Angle (for Anti-Friction Hangers).....₱ ft. 20
Cast Half Round.....₱ ft., ⅝, 30; ¾, 40
Wrought Round.....₱ ft., ⅝, 30; ⅞, 40; ¾, 50

**Bells.**—Connel's Crank Gong, reduced list..dis 15&10 %

**Bird Cages.**—
Japanned M. B. & D., reduced list, 1879.....dis 40 %
Brass M. B. & D., reduced list '79.....dis 33⅓ %

**Blind Fasts.**—Lock Fasts.....₱ C sets $6.00
No. 6 Fasts.....₱ C sets 6.00
Veazie Fasts.....₱ C sets 6.00
Shedd's.....₱ C sets 7.00
**and Hinges.**—Mall, Hook, 3 holes....₱ C sets 7.00

**Brass Awl Handles.**—
Phœnix Adjustable.....₱ doz $2.00

**Bolts.**—Norway Iron Carriage.....dis 75 %
Common Iron Carriage.....dis 80 & 10 %

**Borax.**—Refined.....₱ lb 15c

**Boring Machines.**—
Eagle Upright each.....$6.50 list } dis 40&10 %
Eagle Angle each.....6.75 list }
Snell Augers.....₱ set $2.45

**Braces.**—Barber's.....dis 40&5 %
Spofford's.....dis 10&5 %
Backus'.....dis 10&5 %

**Bracket Saws.**—Holly Scroll Saw.....each $2.25
Demas Lathe and Scroll Saw.....each 6.50
Bracket Saws, extra quality, to No. 5.....₱ gro 6.75
Steel Frame, with patterns.....₱ doz 6.50
Lester.....dis 20 %
New Rogers, all iron.....dis 25 %

**Bracket Saw Blades.**—Griffith's pat....₱ gross 7.50

**Brackets.**—
H. B. & M. Flower Pot, reduced list.....dis 15&10 %
Bronzed Shelf, M. B. & D., new list.....dis 50 %
Store Shelf.....dis 40 %

**Butts.**—Union Fast Joint.....dis 10&10 %
Union Loose Joint.....dis 10&10 %
Union Japanned Acorn.....dis 10&10 %
Union Silvered Acorn.....dis 10&10 %
Union Boston Finish.....dis 70&10 %
Union Spiral Spring.....dis 25&10 %
Wrought Brass.....dis 60& 10%

**Carriage Bolts.**—Eagle Norway.....dis 10&10 %
Common.....dis 80 & 5 %

**Carriage Jacks.**—Climax No. 1.....₱ doz $20.00
Climax No. 1½.....₱ doz 15.00
Climax No 2.....₱ doz 13.50
Universal.....dis 25 %
Universal No. 1.....each, $2.00
Universal No. 2.....each 3.00
Universal No. 3.....each 5.00
Universal No. 4.....each 6.00
Universal No. 5.....each 6.50

**Cartridges.**—U. S. Cartridge Co.....dis 70 %

**Cards.**—
Watson's make Horse & Curry.....dis 10 % } New List,
Watson's Cotton.....dis 10 % } July, 1881.
Watson's Wool.....dis 10 % }

**Casters.**—Bed and Table.....dis 50 %

**Chain.**—Traces 6½, 10, 4, straight.....₱ pair 50c
Traces 6½, 10, 4, twisted.....₱ pair 65c
Traces 7, 12, 2, twisted.....₱ pair 80c
Coil 5-16.....₱ lb 10½c
Coil ¼.....₱ lb 8½c
Coil 5-16.....₱ lb 7c
Coil ⅜.....₱ lb 6½c
Coil 7-16.....₱ lb 6c
Coil ½.....₱ lb 5½c

**Chalk.**—White, Carpenter's.....₱ gross 50c
Red, Carpenter's.....₱ gross 80c
Blue, Carpenter's.....₱ gross $1.00

**Chisels.**—Hart, Hilver & Mead, Framing..dis 50&10&10 %
Underhill, Framing.....dis 25 %
Buck's Chisels.....dis 40 %

**Clothes Line.**—
Galvanized Wire, 100 feet each.....₱ doz $4.00

**Cot Beds.**—"Dover."—Galvanized, New List..dis 60%
Japanned, new list.....dis 60 %

**Cocks.**—Brass, L. F. & Co.....dis 50 %

**Coffee Mills.**—New List.....dis 25 %

**Copper Rivets**.....dis 50&10 %

**Cordage.**—Manilla, usual trade dis 10.....₱ lb 11½c
Jute.....₱ lb 8c

**Cow Ties.**.....dis 33⅓ %
No. 30, 3 ft. No. 6 Wire, with toggle.....₱ doz $3.80
No. 35, 3 ft. No. 6 Wire, with snap.....₱ doz 4.00
No. 40, 3½ feet No. 6 Wire, with toggle.....₱ doz 4.50
No. 45, 3½ ft. No. 6 Wire, with snap.....₱ doz 4.50
No. 50, 4 ft. No. 4 Wire, with toggle.....₱ doz 4.75
No. 55, 4 ft. No. 4 Wire, with snap.....₱ doz 5.00
No. 60, 4½ ft. No. 3 Wire, with toggle.....₱ doz 5.00
No. 65, 4½ ft. No. 3 Wire, with snap.....₱ doz 5.80

**Crow Bars.**—Cast Steel.....₱ lb 7½c
Iron Steel-pointed.....₱ lb 5c

**Cutlery.**—Pocket American Shear Co.'s.....dis 40 %
Butcher Knives Wood's, Lap Bolster, Square Handle.....dis 30 %
Steak Knives.....dis 25 %
Lap Bolster, Oval Handle.....dis 20 %
Stickling.....dis 20 %
Skinning.....dis 30 %
Butcher, Common Round Handle, Wood's.....dis 20 %
Shoe Knives, Wood's.....dis 20 %

**Dividers.**—Cook's.....dis 25 %

**Dog Collars.**.....dis 20 %

**Door Springs.**—Torrey's Rod.....₱ doz $1.62
Imitation Torrey's Rod.....₱ doz 1.44
Gem Coil, new list.....dis 50 & 10 %
Crown.....₱ doz 1.25
Warner's.....₱ doz 2.00

**Door Stops.**—Thurston's.....dis 50 %

**Drawer Knobs.**—Thurston's.....dis 50 %

**Drills.**—Morse Bitt Stock.....dis 25 %
Morse Straight Shank.....dis 20 %

**Emery.**—Wellington Mills.....₱ lb 10c
Walpole Emery Mills.....₱ lb 6c
Turkish in 10 lb cans.....₱ lb 8c

**Enameled Ware.**—
Standard Mfg. Co. Kettles.....dis 40 & 10 %
Standard Sauce Pans.....dis 30 %

**Felloe Plates.**—Wrought.....₱ lb

**Files.**—American File Co.....dis 45 %
Nicholson File Co.....dis 45 %

**Fluting Machines.**—Knox list, $4.00.....dis 20 %
American list, $3.40.....dis 20 %

**Forks.**—W. C. & Co. Manure.....dis 50 %

**Gimlet Bits.**—
Genuine German, No. 12s, 1-32 to 8-32, per doz $1.00
Pierce's.....per doz .88

**Glass Cutters.**—Combination Glass Cutter and Knife Sharpener.....₱ doz $1.00

**Grub Hoes.**—K. P. & Co.'s No 2, $11.50 ₱ doz..dis 50 %

**Hammers.**—Maydole's.....dis 15 %
Hartford Hammer Co.....dis 20 %

**Hangers & Rollers.**—Anti-Friction.....dis 50 %
Acme Rollers.....dis 50 %
Climax.....dis 50 %
Common Hangers.....dis 50 %
Common Rollers.....dis 50 %

**Hand Screws.**.....dis 10 %

**Hatchets.**—C. F. Dowse new list.....dis 33⅓ %
Underhill.....dis 30 %

**Hay Knives.**—Lightning.....₱ doz. $18.00, net
Fisher's Patent.....₱ doz $14.00

**Hinges.**—Strap and T (new list).....dis 60 %
Providence Plate.....₱ lb 5 %
Wrought Screw Hook.....₱ lb 5 %

**Hoes.**—W. C. & Co.'s.....dis 50 %

**Hooks and Staples.**—Brewers' (new list)....dis 60

**Horse Nails.**

| | No. 6 | 7 | 8 | 9 | |
|---|---|---|---|---|---|
| National Finished | .23 | .21 | .20 | .19 | dis 20 % |
| Putnam Pointed | .24 | .22 | .21 | .20 | dis 5 % |
| Bridgewater | .21 | .19 | .18 | .17 | list |

**Ice Cream Freezers.**—Packer's, new list.....dis 50 %

**Knobs.**—"Norwalk." New list.....dis 50 %
Silver Glass.....dis 50&10 %
Silver Glass Bell Pulls.....dis 50&10 %

**Lanterns.**—Tubulars, No. 0.....₱ doz 8.00

**Lawn Mowers.**—The "Daisy."
12 in. cut.....each, $8.00
14 in. cut.....each 8.50
16 in. cut.....each. 9.00
18 in. cut.....each. 9.50

**Lead.**—Sheet.....₱ lb 7½c
Pipe.....₱ lb 6½c

**Locks.**—Norwalk.....dis 50 %
Eagle Cabinet.....dis 25 %
Eagle Trunk.....dis 15 %
W. Wilcox & Co., Padlocks.....dis 50 %

**Manure Forks.**—W. C. & Co.....dis 50 %

**Mattocks.**—
K. P. & Co., Long Cutter, $16.00 ₱ doz.....dis 50 %
K. P. & Co., Short Cutter, $15.50 ₱ doz.....dis 50 %
K. P. & Co., Pick Cutter, $16.00 ₱ doz.....dis 50 %

**Measuring Tapes.**—Eddy's.....dis 20 %

**Meat Cutters.**—Miles' Challenge.....dis 30 %
Hale's, (new list).....dis 40 & 10 %
American.....dis 25 %

**Money Drawers.**—Tucker's Am.....₱ doz $22.50

**Mouse Traps.**—Delusion.....₱ doz 1.50
Novelty.....₱ doz

**Nails.**.....₱ keg 3.15

**Oilers.**—Zinc and Tin.....dis 60 %
Brass and Copper.....dis 50 %

**Ox Bows.**—Extra finished and varnished.....dis 10 %
1¼ in., ₱ doz. pair...$7.00 | 2 in., ₱ doz. pair. $10.00
1½ in., ₱ doz. pair... 9.00 | 2½ in., ₱ doz. pair . 12.00

**Paper.**—Tarred Sheathing.....₱ lb 2½c
Tarred Eagle Brand.....₱ lb 2½c

**Picks.**—K. P. & Co., Adze Eye, 4 to 6 lb $12.00.....dis 50 %
K. P. & Co., Adze Eye, 6 to 7 lb $13.00.....dis 50 %

**Planes.**—
Fancy Planes.....dis 15 %
Razee Planes.....dis 20 %
N. Y. Tool Co.....dis 25 %
English Iron.....dis 20 %
Bailey's.....dis 20&10 %

**Plated Ware.**—Rogers & Bro.....dis 40&5 %

**Pliers.**—Vom Cleff & Co.'s.....net list
Button's Wire Pliers.....dis 33⅓ %

**Plumb & Levels.**—Stanley R. & L. Co ...dis 60&10 %

**Pocket Knives.**—American Shear Co.'s.....dis 40 %

**Potato Diggers.**—W. C. & Co., reduced list..dis 50 %

**Pulleys.**—Acme or Excelsior, 1¾ in.....₱ doz 24c
Acme or Excelsior, 2 in.....₱ doz 27c

**Pulley Blocks.**.....dis 33 %

**Pumps.**—Union Manufacturing Co.
Iron Cistern.....dis 40 %
Iron Pitcher Spout.....dis 50 %
Copper.....dis 30 %

**Rivets.**—Black (new list).....dis 40 %
Carriage in 10 lb papers (new list).....dis 40 %
Copper.....dis 33⅓ %

**Razors.**—Torrey's.....dis 20 %

**Razor Straps.**—Torrey's.....Full line

**Rules.**—Stanley, Boxwood.....dis 50 &10 %
Stanley, Ivory.....dis 55&10 %

**Sad Irons.**—Common.....₱ lb 3½c
Laundry.....₱ lb 5c
Tailors' Geese.....₱ lb 6 c
Enterprise, "Potts".....dis 35 %

**Sash Locks.**—King & Hutchinson's, new list.dis 40 %

**Sandpaper.**—Baeder & Adamson.....dis 30 %
M. B. & D.....dis 1½ %

**Sash Weights.**—Patent Eye.....₱ lb 1½c

**Saws.**—Hand Saws, Disston's.....dis 20 %
Wheeler & Clemson.....dis 20 %

Cross-Cut Saws.
W. M. & Co., Common Tooth, No 1.....₱ foot 35c
W. M. & Co., Champion Tooth.....₱ foot 25c
Disston's, Common Tooth.....₱ foot 68c dis 40 %
Disston's Great American Tooth...₱ foot 68c dis 40 %
Boynton's Lightning Tooth.....₱ foot 45c
M. B. & D., Hand Saws.....dis 33⅓ %
W. M. & Co.'s Circular Saws.....dis 35 %
Richardson Bros.....dis 25 %

**Saw Blades.**—Disston.....dis 20 %
W. M. & C.....dis 10 %
Welch & Griffith, Extra.....₱ doz $8.40
Welch & Griffith, No 2.....₱ doz 7.00

**Scales.**—Fairbanks.....dis 20 %

**Screws.**
American Flat-Head Iron.....new list, dis 55 & 5 %
American Flat-Head Brass.....new list, dis 55 & 5 %
American Round-Head Brass....new list, dis 45 & 5 %
American Round-Head Iron.....new list, dis 50 & 5 %
Grilley Round Head Nickel-Plated Common..dis 40 %

**Scythes.**—Clippers, in boxes.....₱ doz $5.75
**Shaves.**—Kimball's.....₱ inch 75c
Watrous.....dis 15 %
**Shears.**—American Shear Co., new list.....dis 20 %
**Shot.**—Tatham's.....₱ lb 7c
**Shovels.**—O. Ames, new list.....dis 15 %
O. Ames, other brands, new list.....dis 10 %
M. B. & D.....dis 15 %
**Sinks.**—Magee Patent.....dis 30 %
**Snow Shovels.**.....$4.00
**Skates.**—Union.....dis 25 %
Acme.....dis 25 %
Imperial Club list No. 5, $3.75 ₱ pair; list No. 7, $4.00 ₱ pair.....dis 25%
**Stocks and Dies.**—King's.....dis 10&5 %

**Tacks.**
Swedes Tinned.....dis 33⅓&10 %
Swedes Iron.....dis 30 & 10 %
Gimp and Lace.....dis 20 & 10 %
Copper Tacks.....dis 30 & 10 %
All balances on list.....dis 20&10 %
**Traps.**—Oneida, Genuine.....dis 33⅓ %
Oneida, Imitation, H. & N.....dis 40 %
Blake's.....dis 40&10 %
**Vises.**—Simpson's Adjustable.....dis 25&5 %
Howard Vise Co.....dis 25 %
Prentiss'.....dis 20 %
**Weather Strips.**—Packer's.....₱ doz $4.00
Browne's Flexible Rubber.....dis 30 %
In 25 feet boxes: No. 1, ⅛ in. wide, ₱ yard, 10c.; No. 2, ⅜ in., 15c.; No. 3, ¾ in., 20c.; No. 4, 1 in. 25c
Black Walnut Spring Weather Strips.....₱ doz $4.00
**Window Springs**.....dis 25 %
Babcock's No. 3.....₱ gross $6.25
Babcock's No. 4.....₱ gross 4.50
**Wire Cloth.**—"Clinton".....₱ ft.
**Wire Fence.**—Scutt's Patent, Painted.....₱ lb 2½c
Scutt's Patent, Galvanized.....₱ lb 2½c
**Wire Goods.**—Gate Hooks and Eyes, &c..dis 70&10 %
**Wrenches.**—A. G. Coe's.....dis 50 %
Girard Mfg. Co.....dis 40 & 10 %
Girard Agt.....dis 50 & 10 %

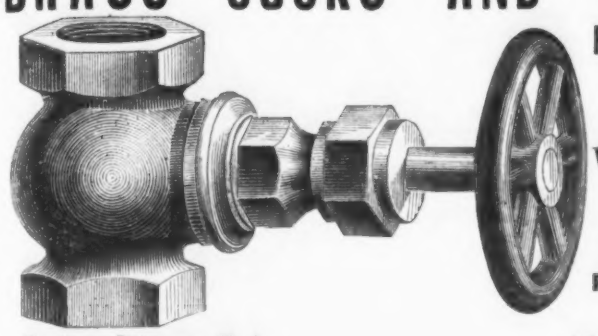
**Wringers.**—
Novelty No 2 for Common Tubs.....₱ doz
Novelty " 3 " " " .....₱ doz
Excelsior E " Stationary Tubs.....₱ doz
Excelsior F " " " .....₱ doz
Excelsior A with Folding Bench.....₱ doz
Excelsior B " " " " .....₱ doz
Novelty Set Tub, E.....₱ doz
Keystone, Wood Frame No 1½.....₱ doz
Keystone, Iron Frame No 2½.....₱ doz

**Zinc**.....₱ lb

## McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

# BRASS COCKS AND VALVES,

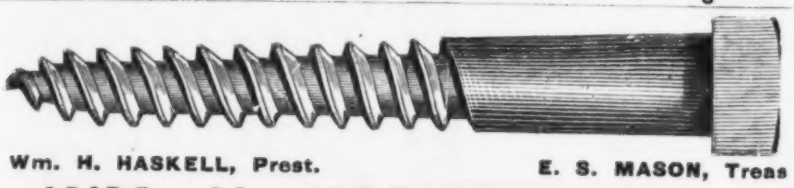


For STEAM, WATER, and GAS. Wrought Iron Pipe and Fittings, PLUMBERS' MATERIALS.

Factory, Paterson, N. J. 56 John Street, N. Y.

Our new Illustrated Catalogue and Price List is now ready, and will be sent to the trade with their first order, or by express, if desired, before ordering.

H. B. NEWHALL CO. 105 Chambers Street, New York Agents.



Wm. H. HASKELL, Prest. E. S. MASON, Treas

## WM. H. HASKELL CO.,

**Pawtucket, R. I.**

MANUFACTURERS OF

# COACH SCREWS,

*(With Gimlet Points,)*

ALL KINDS OF

## Machine and Plow Bolts,

AND

## TAP BOLTS.

HENRY B. NEWHALL CO
105 Chambers St., New York, and 47 Pearl St., Boston, (J. H. WORK, Manager),
EASTERN AGENTS.

## STANDARD NUT CO.,

**Pittsburgh, Pa.,**

MANUFACTURERS OF

**HOT PRESSED**

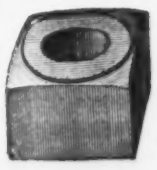
## Square & Hexagon Nuts,

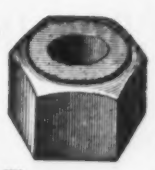
**R. R. FISH BARS,**

**BOLTS,**

**SPIKES.**

**RIVETS, &c.**





HENRY B. NEWHALL CO.,
105 Chambers St., New York, and 47 Pearl St., Boston, (J. H. WORK, Manager),
EASTERN AGENTS.

## Philadelphia "STAR" Bolt Works.

NORWAY IRON FANCY HEAD BOLTS,

**Carriage & Tire Bolts. Star Axle Clips, &c.**

TOWNSEND, WILSON & HUBBARD, 2301 Cherry Street, Philadelphia, Pa.

## G. W. Bradley's Edge Tools.

**Butchers' Cleavers,**
**Butchers' Choppers,**
**Axes and Hatchets,**
**Grub Hoes and Mattocks,**
**Mill Picks,**
**Box Chisels and Scrapers,**

**Ring Bush Hooks,**
**Ax Eye Bush Hooks,**
**Socket Bush Hooks,**
**Watt's Ship Carpenters' Tools,**
**Carpenters' Drawing Knives,**
**Coopers' and Turpentine Tools.**

FOR SALE BY

MARTIN DOSCHER, Agent, 85 Chambers Street, N. Y.

**BLAKE CRUSHER CO.,**

New Haven, Conn.

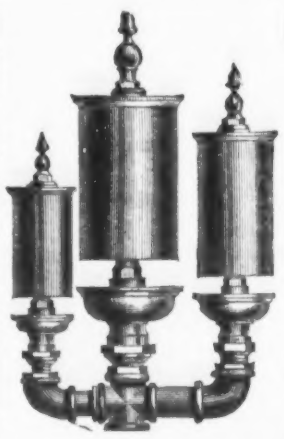
**BLAKE'S**

**Challenge Rock Breakers**

Patented Nov. 18, 1879.

See *The Iron Age* first issue of the month.

WHISTLE CHIMES TO ORDER.



## EATON, COLE & BURNHAM CO.,

58 John St., NEW YORK. Factory at BRIDGEPORT, CT.

MANUFACTURERS OF

# Fittings, Valves, Tools,

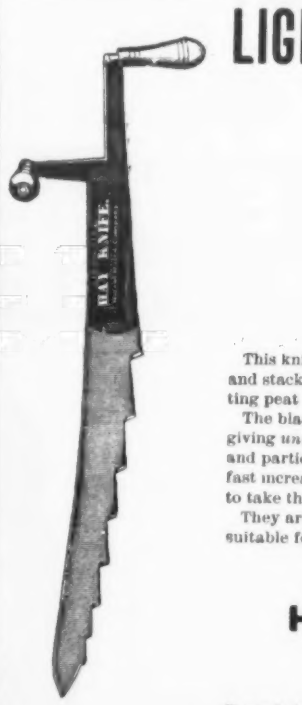
AND ALL STYLES OF

**Goods for Steam, Water, and Gas, Wrought Iron Pipe, &c.**

**Agents for BUNDY'S RADIATORS.**

Manufacturers of

DEANE'S PATENT SOLID STOCKS AND DIES.



# LIGHTNING HAY KNIVES.

**WEYMOUTH'S PATENT.**

This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving *universal* satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for exports as well as home trade, and it *seems destined* to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each of 50 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

## HIRAM HOLT & CO.,

East Wilton, Franklin Co., Maine

For sale by the Hardware Trade generally.

# Ludlow Valve Mfg. Co.

*OFFICE AND WORKS:*

**938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.**

## VALVES.

Double and Single Gate, ⅜ in. to 48 in.—outside and inside Screws, Indicator, &c. for Gas, Water and Steam. Send for Circular.

**Also FIRE HYDRANTS.**

HARCOURT, PALEN & CO.

## BAGNALL & LOUD,

**BOSTON, MASS.**

Sole Manufacturers in U. S. A. of our Celebrated

**METALINE AND Improved Sleeve Roller Bush Tackle Blocks.**

Also a full line of every variety of TACKLE BLOCKS.

***Try Us with a Sample Order.***

Send for Illustrated Catalogue.

New York Warehouse, 33 South Street.

Clasp closed. Clasp opened.

IMPROVED SNATCH BLOCK.

Western Agency: GURNEY & PHALEN, 247 Lake St., CHICAGO.

## THE NOTEMAN ROTARY ENGINE AND PUMP CO.

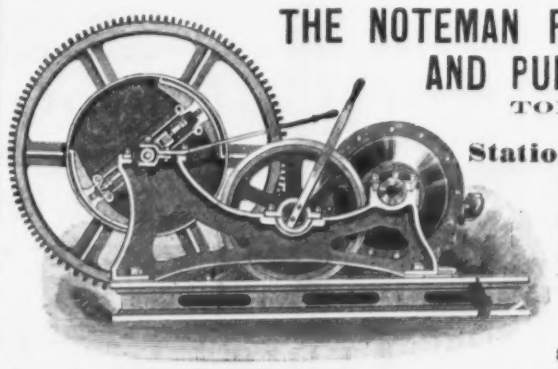
TOLEDO, OHIO.

MANUFACTURE

**Stationary & Hoisting**

# ENGINES

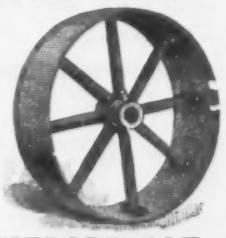
*High Speed Engines.*



## H. H. BALCH,

**86 John St., New York.**

## The Medart Patent Wrought Rim Pulley



THE LIGHTEST, STRONGEST, BEST BALANCED, AND CHEAPEST IN THE WORLD.

We make Whole Pulleys from 9 inches to 96 inches diameter, and Split Pulleys from 12 inches to 72 inches diameter. All widths of face up to 32 inches crowning and up to 36 inches straight: also tight and loose and Double Arms.

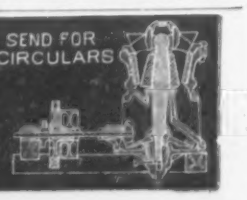
***Absolute Satisfaction Guaranteed.***

SEND FOR PRICE LIST.

**MEDART PAT. PULLEY CO.,** 1206 to 1214 N. Main St., St. Louis, Mo.

THE GREATEST
## ROCK BREAKER
ON EARTH
CAPACITY 1 TON A MINUTE
**GATES IRON WORKS**
50-52 S CANAL ST. CHICAGO.

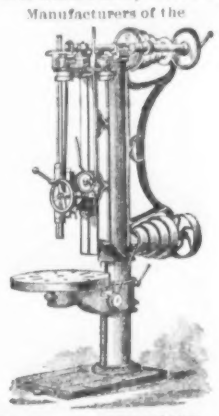
SEND FOR CIRCULARS



## P. BLAISDELL & CO.,

**WORCESTER, MASS.**

Manufacturers of the

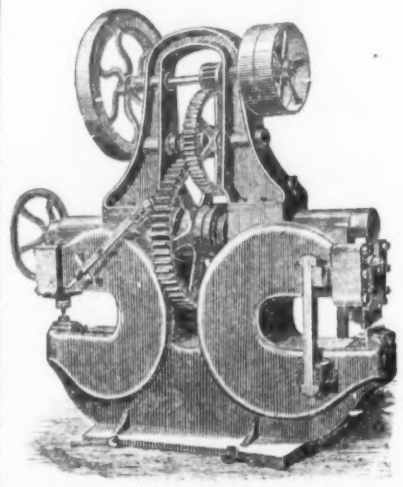


**"BLAISDELL" UPRIGHT DRILLS**

**And other First-Class Machinists' Tools.**

COMBINED

## PUNCH & SHEARS.



Lambertville Iron Works,

## A. WELCH.

LAMBERTVILLE, N. J.

## Holt's Forges.

FIVE SIZES,
FOR ALL KINDS OF WORK.
**$10 and Upward**
Send for circulars.

**HOLT MFG. CO.,**
**Cleveland, Ohio.**

THE "EDDY" STRAIGHTWAY

## VALVES.

ALSO

**FIRE HYDRANTS.**

**Axe, Hatchet, Powder and Brush Machinery.**

**THE EDDY VALVE COMPANY**

WATERFORD, N. Y.

AGENTS IN ALL PRINCIPAL CITIES.

Send for Price List.

## THE LA FRANCE FIRE ENGINE CO.

MANUFACTURERS OF

Rotary Steam Fire Engines

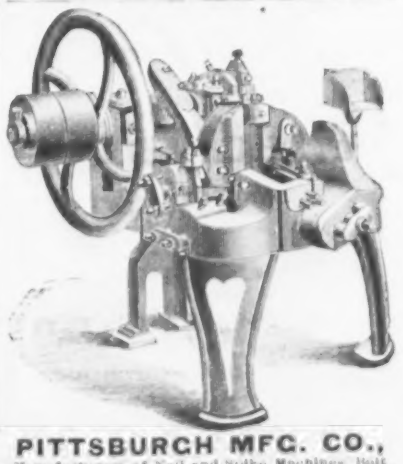
ELMIRA, N. Y.

**BAILY PORTABLE HOIST.**

Warranted double the power and not one-half the price of other hoisters. As a proof of the above, I will give them 30 days on trial. Send for catalogue and price list.

**J. DUNN,**

Cor Dunham and Astor Ave., Cleveland, Ohio.

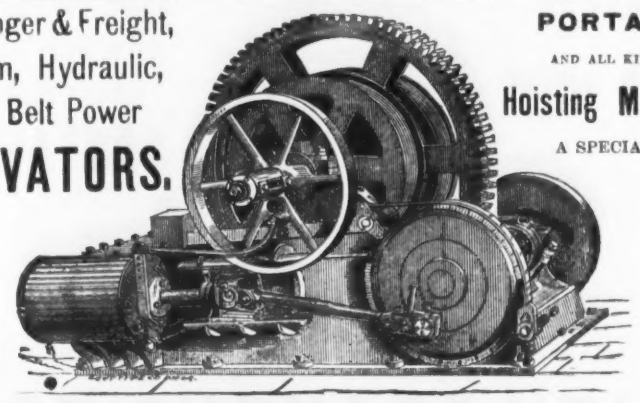


## PITTSBURCH MFG. CO.,

Manufacturers of Nail and Spike Machines, Bolt Nuts, Washers, Rivets, &c. Castings, Forgings and Blacksmith Work promptly attended to.

Office and Works Railroad St., near 26th, Pittsburgh, Pa.

Passenger & Freight,
Steam, Hydraulic,
and Belt Power
**ELEVATORS.**



**PORTABLE**
AND ALL KINDS OF
**Hoisting Machinery**
A SPECIALTY.

## IRON FURNACE HOIST,

For Handling Stock to Top of Stack with One or Two Platforms.

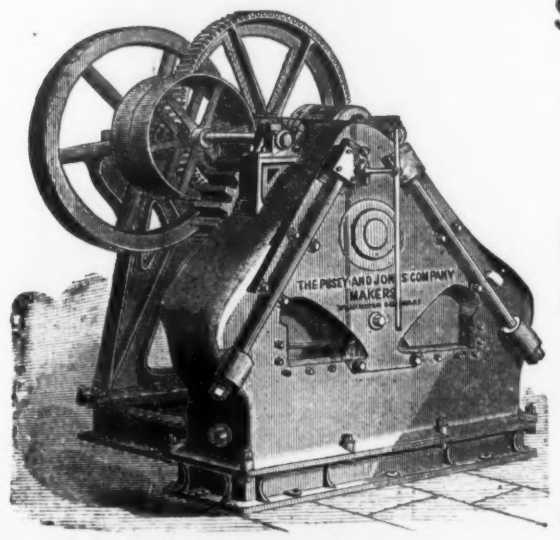
**STOKES & PARRISH, 3001 Chestnut St., Philadelphia.**

---

## THE PUSEY & JONES COMPANY,

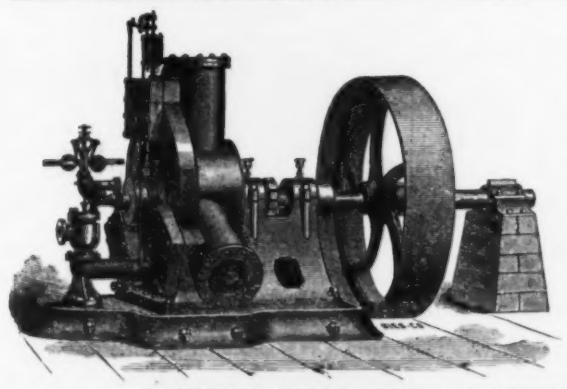
**WILMINGTON, DELAWARE,**

BUILDERS OF




**STEAM ENGINES,**
**Boilers, Tanks,**
MACHINERY FOR ROLLING MILLS,
**Punches, Shears,**
Machines for Cutting off and Slitting old Railroad Rails previous to being piled in Rolling Mills,
**Steam Riveting Machines,**
Applicable to Bridge Builders' Work.
RIGHT AND LEFT ANGLE IRON CUTTERS,
**Hydraulic Bending Machines,**
AND HEAVY MACHINERY GENERALLY.

---



## GARDNER'S PATENT Three Cylinder ENGINE.

**The Most Simple and DURABLE**
**Steam Engine in Use. Adapted for any duty. Send for Illustrated**
CATALOGUE
**Giving full Description.**

**EVERY ENGINE WARRANTED.**

OVER 5000 H. PR. IN USE. Correspondence invited. Special Engine for HIGH SPEEDS, prices of which will be quoted upon application. MANUFACTURED

**EXCLUSIVELY**

**BY R. DUNBAR & SON, Buffalo, New York, U. S. A.**

---

## MONTGOMERY & CO.,

IMPORTERS

Stubs' Files, Tools and Steel, Grobet Swiss Files,

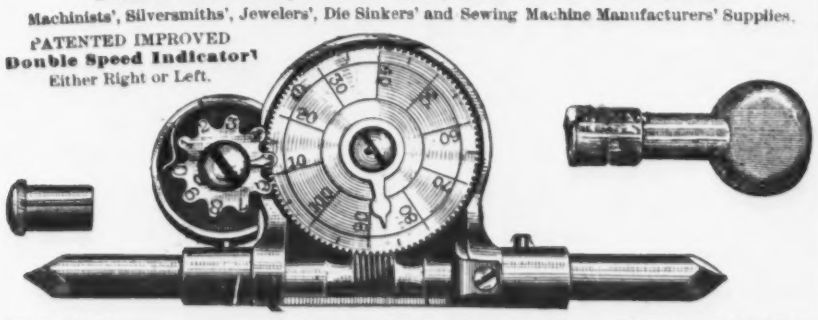
**CHESTERMAN'S MEASURES,**

**Hubert's French Emery Paper, Horseshoe Magnets, &c.**

**WM. SMITH & SON'S CELEBRATED MUSIC WIRE, Nos. 2 to 30**
**French Sheet Steel, 3 1-4 in. wide, from 4 to 65 thousandths.**

Machinists', Silversmiths', Jewelers', Die Sinkers' and Sewing Machine Manufacturers' Supplies.

PATENTED IMPROVED
**Double Speed Indicator**
Either Right or Left.



GEO. W. MONTGOMERY.
GEO. W CHURCH.

**105 Fulton St., NEW YORK**

---

## DROP FORGINGS

**Of Every Description a Specialty.**

ADDRESS,

## R. H. BROWN & CO.,

**WESTVILLE, CONN.**

Also Manufacturers of

**W. A. CLARK'S PATENT EXPANSIVE BIT,**

**CLARK'S PATENT HANDLE SCREW DRIVER.**

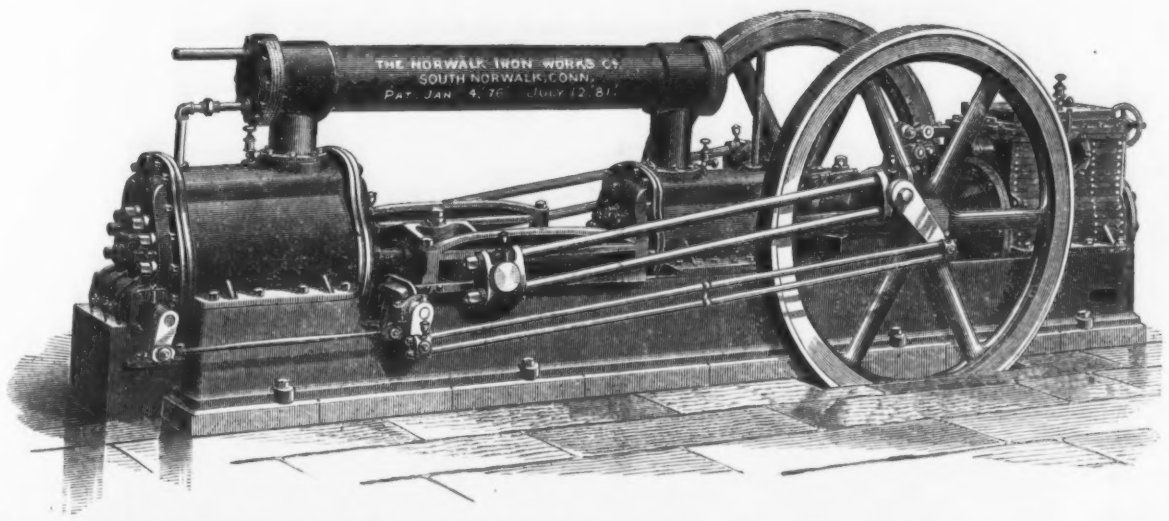
**And Other Specialties in Hardware Line.**

---

**RIVETS** C. F. HARRISON, BOILER, BRIDGE & TANK **RIVETS**
CAYAHOGA FALLS, OHIO.

---

# Air Compressors.

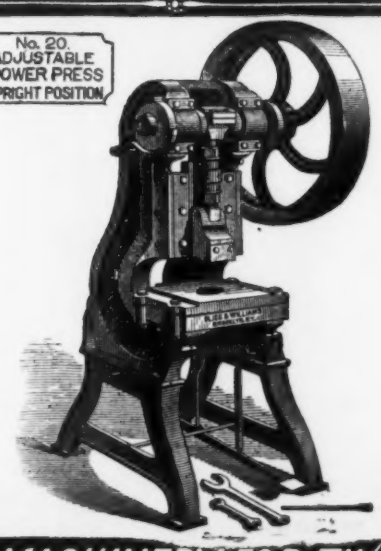



## THE NORWALK IRON WORKS CO., South Norwalk, Conn.

---

## E. W. BLISS
**PRESSES & DIES.**

SHAPERS & SQUARING SHEARS




FINE ENGINE LATHES.

**SPECIAL MACHINERY FOR TIN & SHEET METAL WORKERS**
PLYMOUTH, PEARL & JOHN ST'S. } BROOKLYN, N.Y.

---

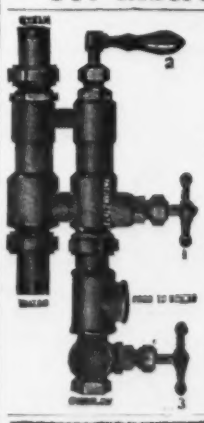
## MANNING, MAXWELL & MOORE,

Sole Sales Agents for **THE MORSE TWIST DRILL AND MACHINE CO.'S**

Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers; also of Solid Bolt and Pipe Dies. Furnished in V, U. S. Standard and Whitworth shape of threads.

**111 Liberty Street. NEW YORK.**

---



## THE HANCOCK INSPIRATOR.

The best **Feeder** known for **Stationary, Marine** and **Locomotive Boilers.**

**REQUIRES NO OILING.**

**Consumes Less Steam Than Any Other Boiler Feeder.**

**SIMPLE, RELIABLE AND ALWAYS IN ORDER.**

**FAIRBANKS & CO.**

**311 Broadway. NEW YORK.**

---

## THOS. H. DALLETT & CO.,

SUCCESSORS TO

THORNE, DeHAVEN & CO., Drilling Machines,

**21st Street, above Market, Philadelphia.**

**PORTABLE DRILLS,** Driven by power in any direction. **RADIAL DRILLS,** Self-feed—Large Adjustable Box Table. **VERTICAL DRILLS,** Self-feeding. **MULTIPLE DRILLS,** 2 to 20 Spindles. **HORIZONTAL BORING AND DRILLING MACHINES. HAND DRILLS. CAR BOX DRILLS. SPECIAL DRILLS,** For Special Work.

---

**Standard Weight Lap Welded**

WROUGHT IRON PIPE, &c.,

**STEAM PUMPS, &c.,**

STEAM AND HYDRAULIC

Freight & Passenger Elevators, &c

STEAM HOISTING ENGINES, &c

MANUFACTURED BY

**CRANE BROS. MFG. CO**

**CHICAGO**

Send for Catalogue

---

**Refined Malleable Iron Castings.**

ORDERS TAKEN FOR ALL VARIETIES OF WORK.

Quality guaranteed. Prices low. Correspondence solicited.

THE SHARON VALLEY MALLEABLE AND GRAY IRON CO.,

**SHARON VALLEY, - - CONN.**

---

## MARTIN REYNOLDS,

354 Lorimer St., Brooklyn, E. D.,

**Brass Smelter & Refiner.**

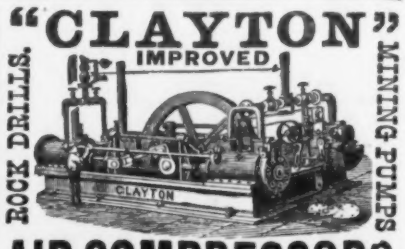
Ingot Brass for Car Bearings a specialty.

Brass washings for bell makers always on hand.

---

## "CLAYTON" MINING PUMPS.

IMPROVED




ROCK DRILLS.

## AIR COMPRESSORS

For CATALOGUES, ESTIMATES, Etc. Address,

CLAYTON STEAM PUMP WORKS

45 & 47 York St., **BROOKLYN, N.Y.**

(Near Approach to New York & Brooklyn Bridge.)

---

## RIVAL STEAM PUMPS

THE CHEAPEST AND THE BEST FOR HOT & COLD WATER.

$35.00 AND UPWARDS.

15 SIZES MANUF'D BY JOHN. H. McGOWAN & CO CINCINNATI

SEND FOR CATALOGUE

---

## DEAD-STROKE POWER HAMMERS.

CONSTRUCTION IMPROVED. Seven Sizes. Prices Reduced. 5 to 250 Pounds.

The 15 and 25 pound sizes are specially adapted for Filemakers' use, the other sizes for general forging. Send for circular and references.

**DIENELT & EISENHARDT,**

MAKERS,

*1310 Howard St., Philadelphia.*

---

## E. E. GARVIN & CO.,

Machinists and Manufacturers of

MILLING MACHINES, DRILL PRESSES, HAND LATHES, TAPPING MACHINES,

**CUTTER GRINDERS & WOOD PLANERS.**

Milling Cutters, all Shapes and Sizes. Gear Cutting and Milling in all its Branches. Index Plates Drilled Accurately. Special Tools and Machinery Designed and Built to Order.

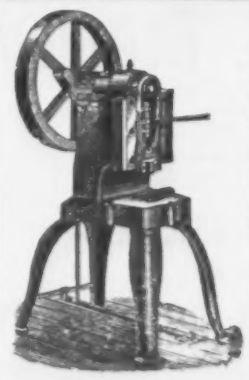
Power Milling Machine.

141 Centre St., New York. Send for Illustrated Catalogue.

---

THE BEST NUT TAPP'G MACHINES. | RAPID BOLT CUTTERS & POINTERS | BOLT IRON CUTTERS SEND FOR PRICES. | THE PURDY MACHINE Co CLEVELAND O.

---



## A. H. MERRIMAN,

Meriden, Conn.,

Manufacturer of all Descriptions of

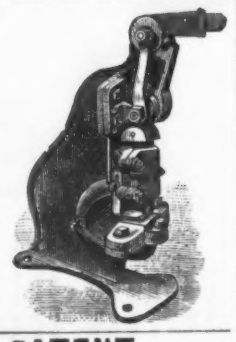
## PRESSES.

Catalogue and prices sent on application.

## Machinery, &c.

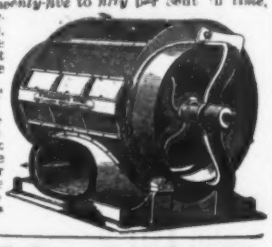
### LYON'S HAND OR POWER PUNCHES AND SHEARS.

For Round, Flat or Square Iron,
ALSO,
Polishing & Buffing Machinery,
**HYDRAULIC JACKS,**
To raise from 2 to 120 tons.
Hydraulic Presses for Special & General Use.
**HYDRAULIC HAND & POWER PUMPS**
with 1 to 6 plungers, to run hydraulic presses, with either uniform or changeable speed.
Second-hand Presses.
**WATSON & STILLMAN,**
(Successors to E. LYON & CO.)
470 B Grand Street, NEW YORK.
Send for circular of what you want.



### THE MACKENZIE PATENT CUPOLA & BLOWER.

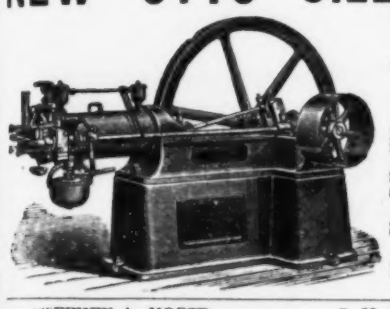
Send for circular to
**Smith & Savre Mfg. Co.,**
PROPRIETORS, 345 Broadway, New York.



This Cupola has made a great revolution in melting Iron. It differs from all others in having a CONTINUOUS TUYERE, or in other words, the blast enters the fuel at all points. Above one ton capacity per hour, they are made *oval in form*. This brings the blast to the center of the furnace with the *least resistance* and *smallest* possible amount of power, and in combination with the continuous Tuyere causes complete diffusion of the air throughout the furnace, and uniform temperature, melting *ten* or *fifteen tons* an hour with the pressure of blast required to melt *two* or *three tons* in an ordinary Cupola. It also enables us to save very largely in *time* and *fuel*, the experience of our customers showing a gain of *twenty-five* to *fifty* per cent. in *time*, and *twenty-five* to *forty* per cent. *fuel* over the ordinary Cupola, and a BETTER QUALITY OF CASTING, especially in light work. This is due to the thorough diffusion of the air and more perfect combustion, extracting less carbon from the iron, making a softer and tougher casting.

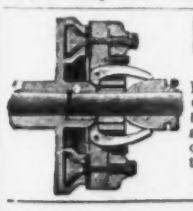
We manufacture these Cupolas of any desired capacity, numbered from 1 to 20, inclusive, the numbers indicating the melting capacities in TONS PER HOUR—No. 1, one ton, ; No. 2, two tons; No 3, three tons per hour, and so on up to 15, or 20 tons. We have *improved* the *construction* of these Cupolas in every way, have increased their strength and durability, and sought to make them as convenient for working and repairs as our own and the experience of our customers could suggest

### NEW OTTO SILENT GAS ENGINE.



**Working Without Boiler, Steam, Coal, Ashes or Attendance.**
***Started Instantly by a Match, it gives Full Power Immediately.***
**When Stopped, all Expense Ceases.**
No explosions, no fires nor cinders, no gauges, no pumps, no engineer or other attendant while running. Recommended by insurance companies.
UNSURPASSED IN EVERY RESPECT for hoisting in warehouses, printing, ventilating, running small shops, &c.
1, 2, 4, 7, 10, 15 and 25 Horse-Power. Built by
**SCHLEICHER, SCHUMM & CO.,**
Engineers and Machinists,
N. E. Cor. 33d & Walnut Sts., Phila'phia.
214 Randolph St., Chicago.

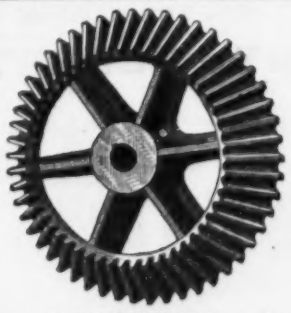
STEPHEN A. MORSE. C. M. WILLIAMS. EDWIN F. MORSE.
SEND FOR CIRCULARS. **CLEM & MORSE,** LATEST PATENTED IMPROVEMENTS.
Manufacturers and Builders of
# ELEVATORS,
**Hoisting Machinery, Automatic Hatch Doors, &c.**
413 Cherry St., PHILADELPHIA, PA. Branch Office, 108 Liberty St., NEW YORK.



### HOISTING ENGINES.

We are now prepared to deliver 6X12 and 7X12 single cylindered Horizontal Engines, and double cylindered at short notice, with the ***Frisbie Friction Clutch*** attached, with or without boilers. This clutch has proved to be the best in the world for this work. It can be so adjusted that it will do a small amount of work, and from that up to the full power of engine, with no risk of breaking ropes, gearing or engine, a feature which no other friction contains. Address,
**D FRISBIE & CO., 481 N. Fifth St., Phila., Pa.**

**MACHINE MOLDED GEARING**



From 1 to 20 feet Diameter.

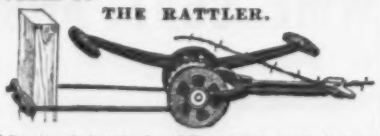
**SHAFTING, PULLEYS AND HANGERS**
A Specialty.

**POOLE & HUNT, BALTIMORE, MD.**

### J. HAISH & CO.,

SOLE MANUFACTURERS OF

THE RATTLER.



Haish's S Barb Steel Fence Wire, the Pioneer and Duplex Galvanized and Enameled; barbs locked to both wires, and possesses more excellent qualities than any fence ever produced. We also call your attention to the **Jacob Haish Wire Fence Stretcher,** Double Crank, Double Rope, Center Draft, and offered to the public as the best device in the world for stretching wire fences. Every Stretcher guaranteed to do perfect work or no sale. Send for sample and price list. Liberal discount to jobbers.
**HOME OFFICE, DE KALB, ILL.**

### DRILL PRESSES.

New Upright Power Drill Presses. No. 3 swings 22 inches; back-geared, quick return. A strong iron brace extends from base to head of column—a new feature. Weight, 1100 lbs.; hight, 6 feet. Price, **$210.**

No. 1¼ on legs, swings 15¼ inches, 4 speeds. Price, **$75.**

No. 1 size, to set on bench, swings 13 inches, lever feed, 3 speeds, tight and loose pulleys. Price, **$35.**

Peerless Punch & Shear Co.,
38 W. Dey Street, New York.

WE CHALLENGE THE WORLD FOR ITS EQUAL.
The cheapest, most durable and effective Tool for Cleaning Tubes Hot or Cold.
**GUFFNER & DUNN,** Schuylkill Falls, Philadelphia, Pa.
Patentees and Sole Manufacturers of the EXCELSIOR STEAM TUBE CLEANERS. Most liberal discount to dealers. Send for Circulars.

### PUNCHING & SHEARING PRESSES.

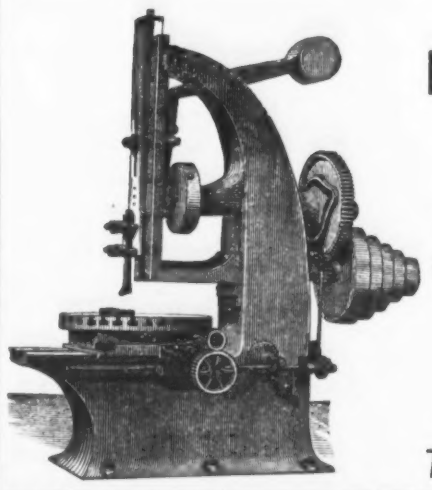
Power, Foot or Hand
**PUNCHES,**
AND
**SHEARS.**
All sizes, from $25 to $3,000
**Peerless Punch & Shear Co.,**
*38 W. Dey Street,*
NEW YORK CITY.

**WM. McFARLAND**
**Iron and Brass Founder.**
**TRENTON, N. J.**
Chilled Cast Wire Dies a Specialty.
Any size or style made at short notice.

## Machinery, &c.

### WILLIAM SELLERS & CO.,

**PHILADELPHIA.**



MANUFACTURERS OF
**Iron and Steel Working Machinery.**
MACHINISTS' TOOLS,
SHAFTING,
GEARING, &c.,
INJECTORS.
BRANCH OFFICE:
79 LIBERTY STREET, NEW YORK.

### SOUTHWARK FOUNDRY & MACHINE CO.,

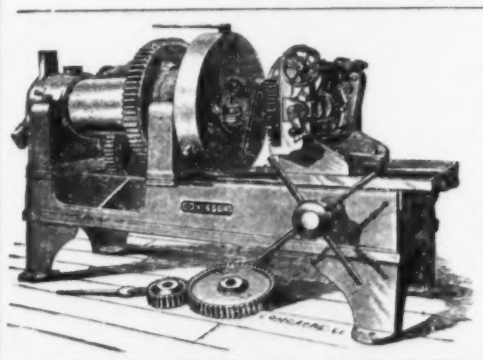
**430 Washington Ave., PHILA., PA.,**

**ENGINEERS AND MACHINISTS.**

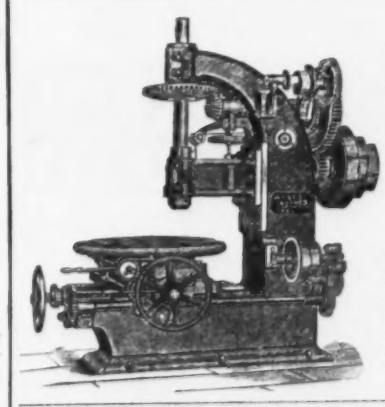
**BLOWING ENGINES AND HYDRAULIC MACHINERY.**

SOLE MAKERS OF THE

**PORTER-ALLEN AUTOMATIC CUT-OFF STEAM ENGINE.**

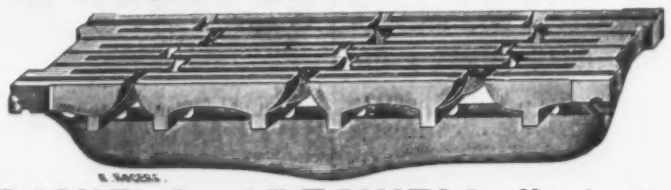


Machines for Threading and Cutting off Pipe from one-eighth inch to twelve inches diameter. Hand Screwing Machines one-eighth inch to two inches.
**COX & SONS,**
204 N. 4th St.,
PHILADELPHIA, PA.



**VERTICAL MILLING MACHINES,**
MADE BY
**HILLES & JONES,**
WILMINGTON, DEL.
By actual demonstration it has been proven that our HEAVY VERTICAL MILLING MACHINES will do a large amount of work that is now done on slotting machines, with a saving of 50 per cent. of files and finisher's time. To work out Links, Connecting-Rod Straps, Guide Yokes, Cross-Heads, Connections, &c., make the milling tool the proper diameter for the fillets; you then obtain the right radius and uniformity of size and style.
THREE SIZES.

### W. C. WREN'S PATENT GRATE BAR.



**DAVID S. CRESWELL,** Manufacturer,
816 Race Street, - - - PHILADELPHIA, PA.
The most durable Grate Bar on the market. Send for circular and price list.

### HARRISON BOILER.

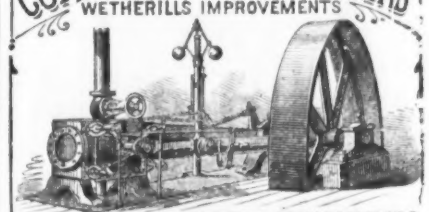
BOILER MADE OF SPHERES MUST UNITE GREATEST

STRENGTH WITH MOST HEATING SURFACE.
*Send for* CIRCULAR.

## Machinery, &c.

### CORLISS ENGINE BUILDERS

WITH WETHERILLS IMPROVEMENTS



ENGINEERS, MACHINISTS, IRON FOUNDERS AND BOILER MAKERS.
ROBT. WETHERILL & CO. Chester, Pa.

### STOW FLEXIBLE SHAFT CO., Limited

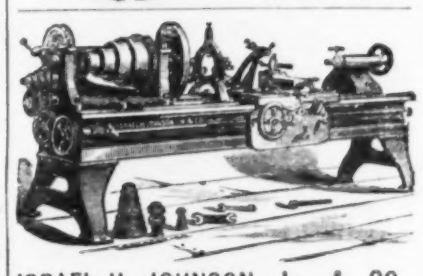
15th & Pennsylvania Ave.
PHILADELPHIA, PA.,
Manufacturers of
Portable Drilling, Tapping, Reaming and Boring Machines.
Also, Tools for Emery Wheel Grinding, Metal & Wood Polishing, Cattle Brushing & Tipping, &c.
General European Agents BOLLING & LOWE, 2 Lawrence Pountney Hill, London, England.

### CHARLES W. ERVIEN & CO.,

**Engine Builders, Boiler Makers and**
**GENERAL MACHINISTS,**
IRELAND STREET, PHILADELPHIA.

### PHILA. SHAFTING WORKS.

GEO. V. CRESSON,
18th & Hamilton Sts.
PHILADELPHIA.
**SHAFTING** *A SPECIALTY*
Manufacturers of Shafting, Pulleys, Hangers, Couplings, and every appurtenance used in the TRANSMISSION OF STEAM POWER.



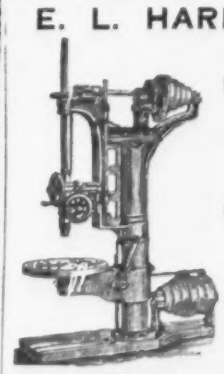
### ISRAEL H. JOHNSON, Jr., & CO.,

**Tool and Machine Works,**
Manufacturers of
ENGINE, BRASS FINISHERS', WOOD TURNERS' AMATEURS' and JEWELERS' LATHES.
Slide Rest, Screw Machines, Turret Heads, Screw Presses, Screw Clamps, Lathe Carriers, &c.
1422, 1424 & 1426 Callowhill Street, Philadelphia, Pa.
*Israel H. Johnson, Jr. Joshua R. Johnson, Jr.*

Established 1867.
### Edwin Harrington & Son,

MANUFACTURERS OF
PATENT EXTENSION AND SCREW CUTTING
**LATHES**
**Iron Planers,**
Radial, Upright, Suspension Multiple and Lever
**DRILLS,**
and a variety of other MACHINISTS' TOOLS
Patent
**Double Chain Screw Pulley Blocks,**
Unrivalled for *Durability, Safety* and *Power.*
**Patent Double Chain Quick-Lift Hoists,**
with Brake for quick and slow lifting.
Circulars furnished.
WORKS AND OFFICE,
Cor. N. 15th and Penna. Ave., Philadelphia, Pa., U. S. A.
Represented by J. Q. MAYNARD, 12 Cortlandt St., N. Y., C. E. KIMBALL, 191 High St., Boston, W. H. RICKEY, 116 Main St. Cincinnati.

### E. L. HARRINGTON,



Manufacturers of
MACHINISTS' TOOLS
AND
**Special Machinery.**
UPRIGHT DRILLS A SPECIALTY.
426 N. 23d Street
(Cor. of Linn),
Philadelphia.

### G. E. BRETTELL,

Furnace St.,
Rochester, N. Y.
Planers a Specialty
26x26, 30x26 and 30x30 in. to plane 7 and 10 ft. long.
SEND FOR PRICE LIST.

Mention The Iron Age.
G. Brettell, Rochester N. Y.

## TUBAL SMELTING WORKS,

760 & 762 Broad Street, PHILADELPHIA.

**PAUL S. REEVES,**

MANUFACTURER OF

# GENUINE BABBITT METAL

AND ALL GRADES OF

**ANTI-FRICTION METALS.**

ESTABLISHED 1843.

## WM. & HARVEY ROWLAND,

PHILADELPHIA,

P. O. Address: Frankford, Phila'a. } MANUFACTURERS OF ALL KINDS OF

# Elliptic, Platform AND C Springs,

"Brewster Side-Bar Combination Patented" Springs and Timken's Patent Cross Springs,

Reiff's Patent, Groot's Patent, Carter's Patent and Saladee's Patent Crescent Spring,

MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

**Swedish Tire, Toe, Blister and Spring Steel.**

**CAST SPRING AND PLOW STEEL.**
**CAST SHOVEL, HOE AND MACHINERY STEEL.**

OXFORD TOE, SLEIGH, TIRE AND SPRING STEEL.
BESSEMER SHOVEL AND PLOW STEEL.
BESSEMER MACHINERY AND CULTIVATOR STEEL.

**RE-ROLLED NORWAY SHAPES.**

NORWAY NAIL RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.

# STEEL CASTINGS

**FROM 1-4 TO 15,000 LBS. WEIGHT,**

True to pattern, sound and solid, of unequaled strength, toughness and durability. An invaluable substitute for forgings, or for cast iron requiring three-fold strength. Gearing of all kinds, Shoes, Dies, Hammerheads, Crossheads for Locomotives, etc. 20,000 Crank Shafts and 15,000 Gear wheels of this Steel now running prove its superiority over other Steel Castings. CRANK SHAFTS, CROSSHEADS AND GEARING ARE SPECIALTIES. Castings of every description. Circulars and Price Lists free. Address

CHESTER STEEL CASTINGS CO.,

*Works, Chester, Pa.* 407 Library st., Philadelphia.

## PITTSBURGH STEEL CASTING CO.,

26th and Railroad Streets, PITTSBURGH, PA.

MANUFACTURERS OF

**Refined Bessemer Steel; AND Improved Steel Castings**

Under Hainsworth's Patents.

We are now prepared to fill orders for refined **BESSEMER BILLETS or BLOOMS** of any desired carbon and a uniform quality.

We would call attention of consumers to the fact that we use good material, and produce a steel pronounced by competent judges equal to the best English or German spring and soft steels.

Having had twelve years experience in the making of **STEEL CASTINGS**, we are able to refer to our customers in all part of the United States and Canada as to the quality of our work in this line. We make castings of steel practically free from blow-holes, as soft and easily worked as wrought iron, yet stiff, strong and durable, with a tensile strength of not less than 65,000 pounds to the square inch. In short, our castings unite the qualities of steel and wrought iron.

Wheels, Pinions, Cranks, Dies, Hammer Heads, Engines and Machinery Castings of all descriptions, Railroad Frogs and Crossings Plowshares, Moldboards and Landsides Special attention given to Heavy Castings. We use no cast iron in our castings. Send for circular.

## Punching Presses,

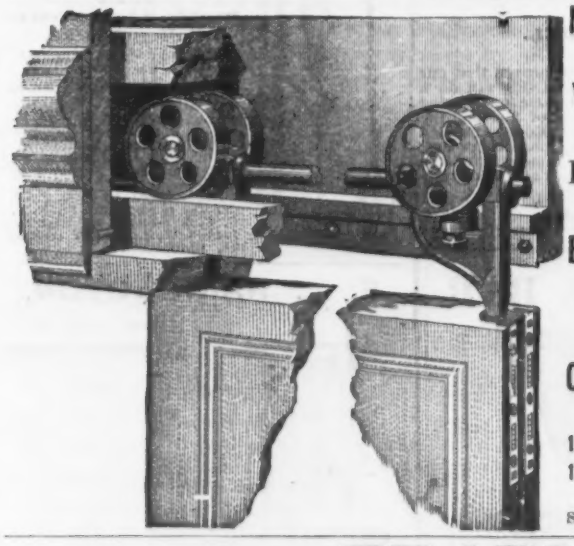
DIES AND OTHER TOOLS

For the manufacture of all kinds of

SHEET METAL GOODS, DROP FORGINGS, &c.

Stiles & Parker Press Co.,

Middletown, Conn.



## NO FLANGED WHEELS.

Warner's Patent

SLIDING DOOR HANGER,

MANUFACTURED BY

E. C. STEARNS & CO,

SYRACUSE, N. Y.

SALES OF

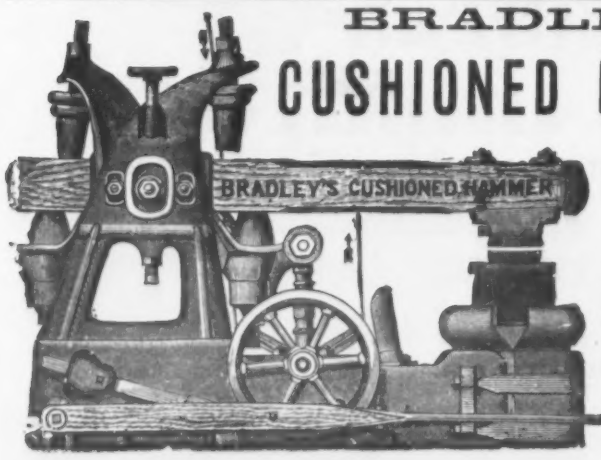
CHAS. HUMES & CO.,

ST. LOUIS MO.

1877, - - - 20 SETS
1881, - - - - 500 SETS

Send for Illustrated Catalogue.

## BRADLEY'S




# CUSHIONED HAMMER

STANDS TO-DAY WITHOUT AN EQUAL.

Over 800 in use.

It approaches nearer the action of the smith's arm than any hammer in the world.

Bradley & Co.

SYRACUSE, N. Y.

(Established 1832.)

## STANLEY G. FLAGG & CO.

PHILADELPHIA, PA.

Office and Works,

N. W. cor. 19th St. & Pennsylvania Ave.

Manufacturers of

**STEEL CASTINGS.**

A Substitute for Steel & Wrought Forgings.

☞ Circulars sent on application. ☜

## Steel Castings.

Light and heavy **Steel Castings** of superior metal, solid and homogeneous. All work guaranteed. Send for circular.

EUREKA CAST STEEL CO., Chester, Pa.

*Office: 307 Walnut St., Phila.*

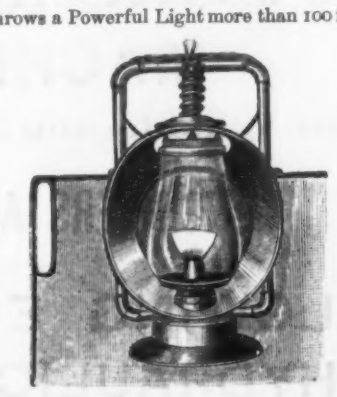
## "DIETZ" TUBULAR OIL STOVE

FOR 1883.

**"DIETZ" No. 0 TUBULAR REFLECTOR LANTERN,**

WITH DASH ATTACHMENT:

Throws a Powerful Light more than 100 feet.



56 Fulton Street, - - NEW YORK.

25 Lake St., CHICAGO.

## TACKLE BLOCKS.

Rope and Iron Strap of all kinds. Lignumvitæ Wood for Ten-Pin Balls.

Wm. H. McMillan & Bro.,

*Office, 113 South Street, New York*

*Factory, 32 to 40 Penn St., Brooklyn, E. D.*

## COLUMBIA BICYCLE.

The Bicycle, as a permanent, practical road vehicle, is an acknowledged fact, and the thousands in daily use are constantly increasing in numbers. It combines speed and endurance that no horse can equal, and for pleasure or health is far superior to any other out-door sport. The art of riding is easily acquired, and the exercise is recommended by the medical profession as a means of renewing health and strength, as it brings into action almost every muscle of the body. Send 2c. stamp for 24-page illustrated catalogue, containing price lists and full information.

THE POPE MFG. CO.,

597 Washington st., Boston, Mass.

New York Riding School, 34th Street, near 3rd Avenue.

**THE BEST IN USE.**

## DUC'S IMPROVED ELEVATOR BUCKET

This is the only scientifically constructed bucket in the market. It is struck out from charcoal stamping iron. "No corners to catch." "No seams to burst." "No interior corners to clog up." It runs with great ease and half the power of the old style bucket. Will outwear half a dozen of them. *Prices Reduced.*

T. F. ROWLAND, Sole Mfr.,

BROOKLYN, N. Y.

## MICHIGAN BLOCK WORKS.

Detroit, Mich., U. S. A.

Send for Catalogue and Price List.

## BUFFALO SCALE CO.,

BUFFALO, N. Y.,

Manufacturers of

R. R. Track Scales, Hay Scales, Coal Scales, Grain Scales, Platform Scales, Counter Scales, &c.

Send for price list, stating what you want.

## Scranton Brass and File Works.

J. M. EVERHART,

Manufacturer of

BRASS WORK,

For Water, Gas & Steam.

Exhaust Steam Injecter, using waste Steam only, returning it to Boiler with water at 190 degrees.

Also, PATENT CUT FILES.

SCRANTON, PA.

## BLACKSMITH DRILLS.

CLARK SINTZ & CO.

SPRINGFIELD OHIO

## RUSSELL, BURDSALL & WARD.

PORTCHESTER, N. Y.,

MANUFACTURERS OF

CARRIAGE, TIRE, **BOLTS** PLOW, STOVE, &c.

Carriage Bolts made from Best Square Iron a Specialty.

## JOHN RUSSELL CUTLERY CO.,

Green River Works,

MANUFACTURERS OF

# Table and Pocket Cutlery,

BUTCHERS,' HUNTERS', PAINTERS', DRUGGISTS' & HOUSEHOLD KNIVES

IN ALL STYLES AND VARIETIES.

OLDEST AND LARGEST AMERICAN MANUFACTURERS.

Factories, J. RUSSELL & CO. ESTABLISHED 1834. GREEN RIVER WORKS, MASS. Turners Falls, Mass.

F. W. WURSTER,

IRON FOUNDRY AND AXLE WORKS,

*130 to 142 First St., Brooklyn, N. Y.*

# AXLES

SUPERIOR WAGON, CART AND CARRIAGE AXLES.

Our facilities enable us to quote the trade lower prices than any other manufactory. Send for price list.

MANUFACTURER OF TAPS AND DIES.

## "BOYNTON'S" UNRIVALED SOLID STEEL SAW SET.

E. M. BOYNTON SAW & FILE CO.

34, 36, 38, 40 & 42 DEVOE ST.

BROOKLYN.

The only perfect set known; a blind man can use it by simply bringing handles together. A perfect gauge, adjusted by a single thumb-screw, will set both points of a Lightning Buck Saw at once, and will set any saw from an ordinary hand saw to a 12 gauge mill saw.

**10 in. Solid Steel, $12 per doz.**
**No. 2 Size. $10 per doz.**
**25 % discount.**

"BOYNTON'S PATENT LIGHTNING SAW SET AND FILE COMBINED."

5 in., $3.50. 8 in., $5.50.
10 in., $6.50.
Less 40 % discount.

BOYNTON'S "PATENT LOOP" Cross Cut Saw Handles.

Per Dozen, 15 Cents Each,
Per 100, Barreled, 12½ Cents Each.
Per 1000, Barreled, 10 Cents Each.

It has no rival; it is the best, the heaviest, the strongest, and outsells all others.

## E. M. BOYNTON,

80 Beekman Street, NEW YORK.

## THE GILBERT & BENNETT MFG. CO.

Georgetown, Conn.,

Manufacturers of

Iron Wire, Sieves and Wire Cloth,

Power Loom Painted Screen Wire Cloth

GILBERT'S RIVAL ASH SIEVE.

Galvanized Twist Wire Netting.

WAREHOUSE:

*49 Cliff Street, New York*

## GEM

## WIRE COAT AND HAT HOOKS.

EASILY PUT UP OR REMOVED.

NO SCREWS OR TOOLS REQUIRED.

☞ LARGE REDUCTION IN PRICES.

LIST.—WALNUT, BRONZED.

| | | | |
|---|---|---|---|
| No 50, 2-inch | $1.75 per gross. | No. 70, 3-inch | $2.40 per gross |
| No. 60, 2½-inch | 2.00 " | No. 80, 3½-inch | 3.00 " |

SEND FOR DISCOUNTS TO

## VAN WAGONER & WILLIAMS CO.,

MANUFACTURERS OF

SPRING HINGES, DOOR SPRINGS, WIRE COAT AND HAT HOOKS, &C.

82 BEEKMAN ST., NEW YORK.